William Wilson.

William Wilson

BURNDY
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GIFT OF
BERN DIBNER

Case. II

Given one Side and an Angle
To find the other Sides

Sides { A. C. 410 } Angle A 45° 0′

Blessed Lord who hast caused all
holy Scriptures to be written for our
learning grant that we may in such
wise hear them

SS 1310B RB NMAH

Case. IV

Given the Sides A. B and A. C
To find the Angle A

Sides A.B. 540 and A.C. 654

Case. V.

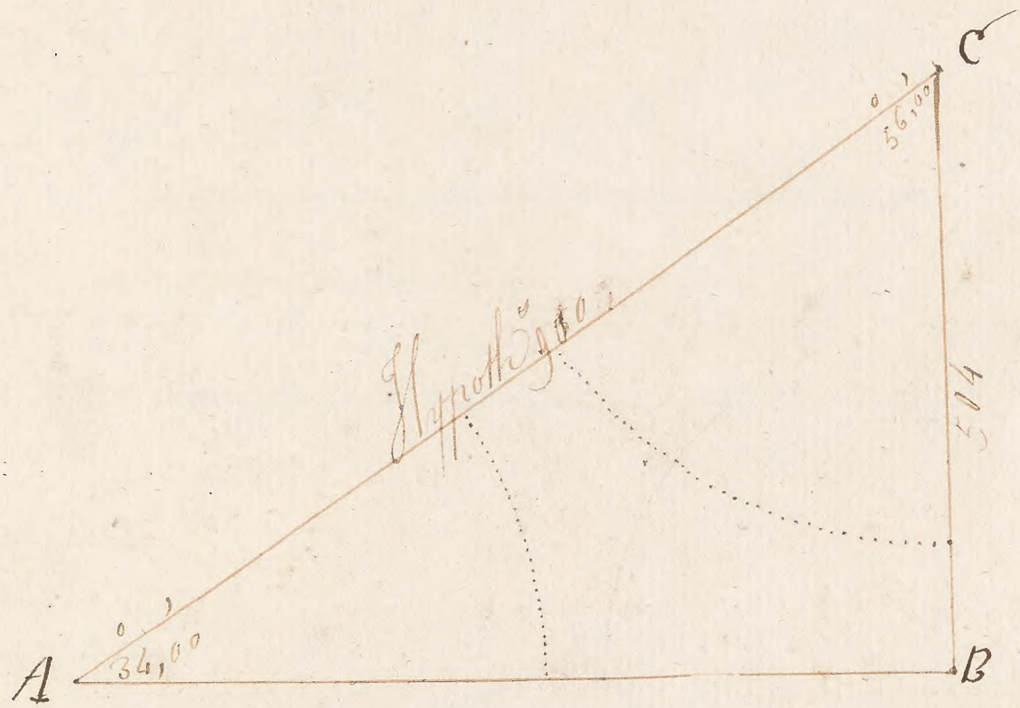
Given the Hypoth. and one Leg
To find the other Leg ------

Sides A.C. 540 A.B. 449

Case. VI.

Given the Legs A B and B C
To find the Angles and Hypothenuse

Sides A B 40 ft. B C. 60 ft



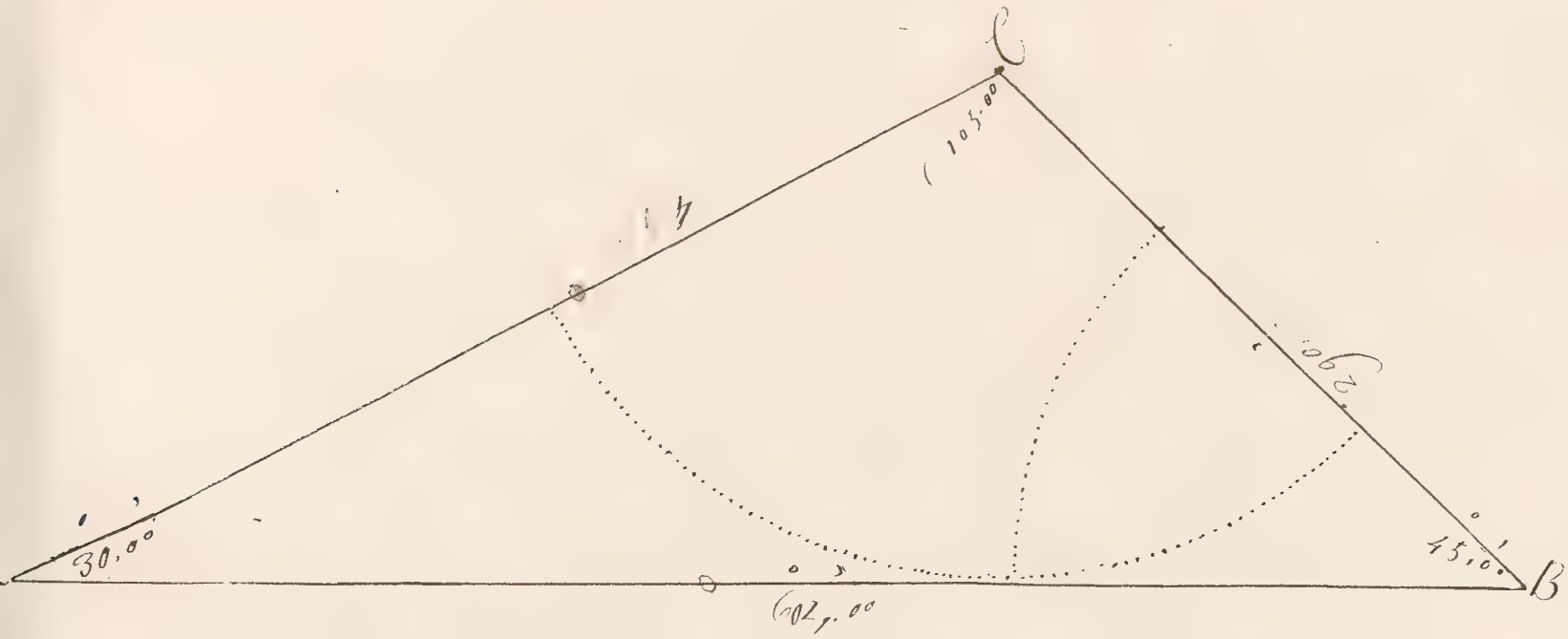
Oblique plain Trigonometry

Geometrical

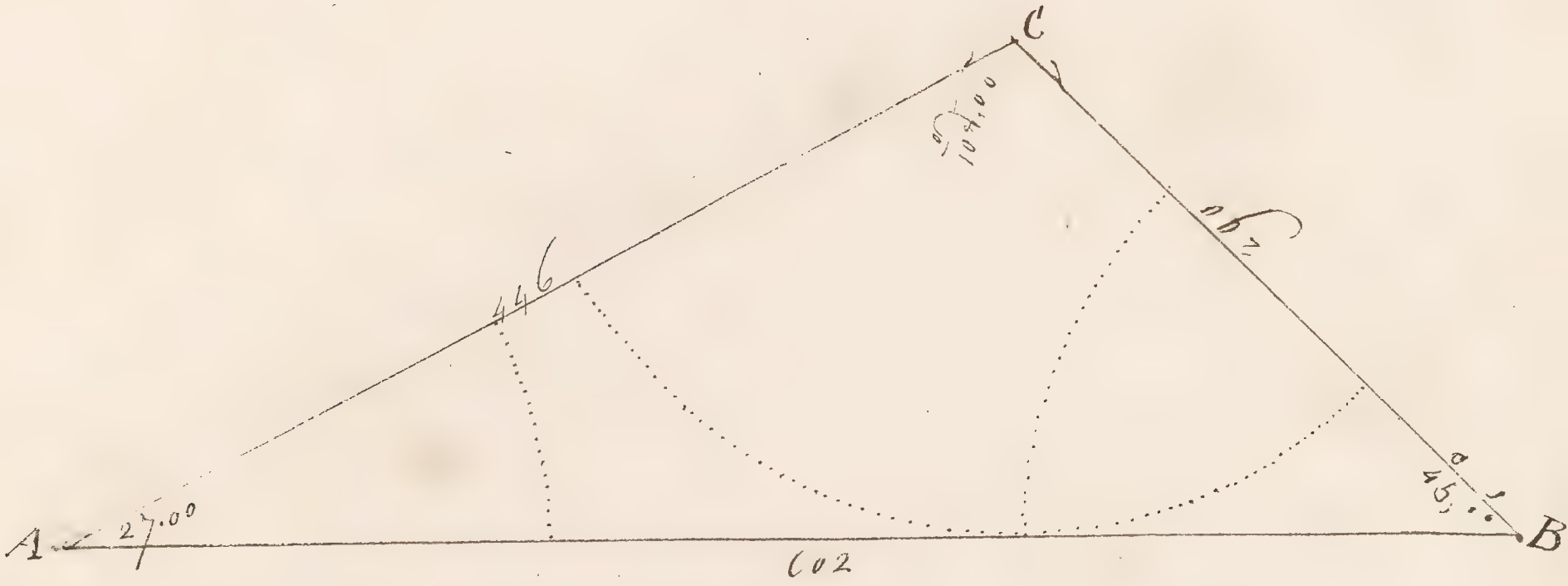
Case 1.

Given two Angles and the Side opposite to one of them to find the other Sides

Angles { A 30.00 / B 45.00 } C = 105.00



Case 11.

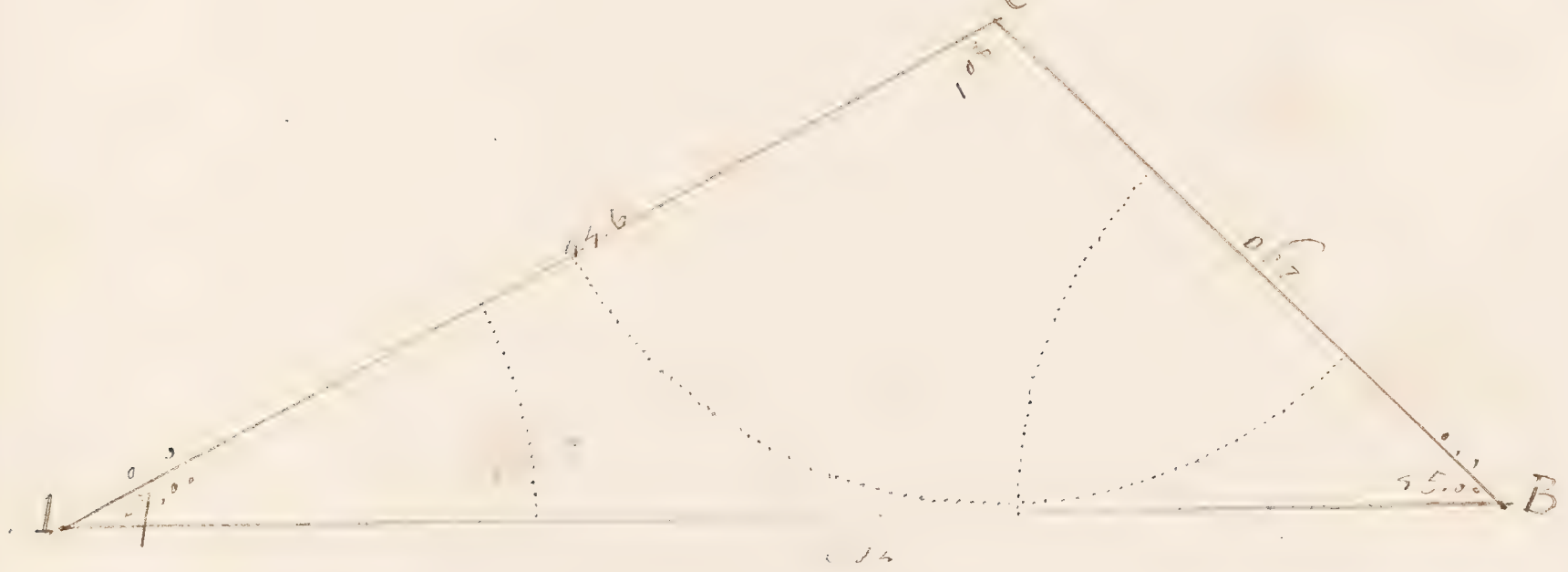


Case. 111.

Given two Sides and an Angle Included

to find the Side

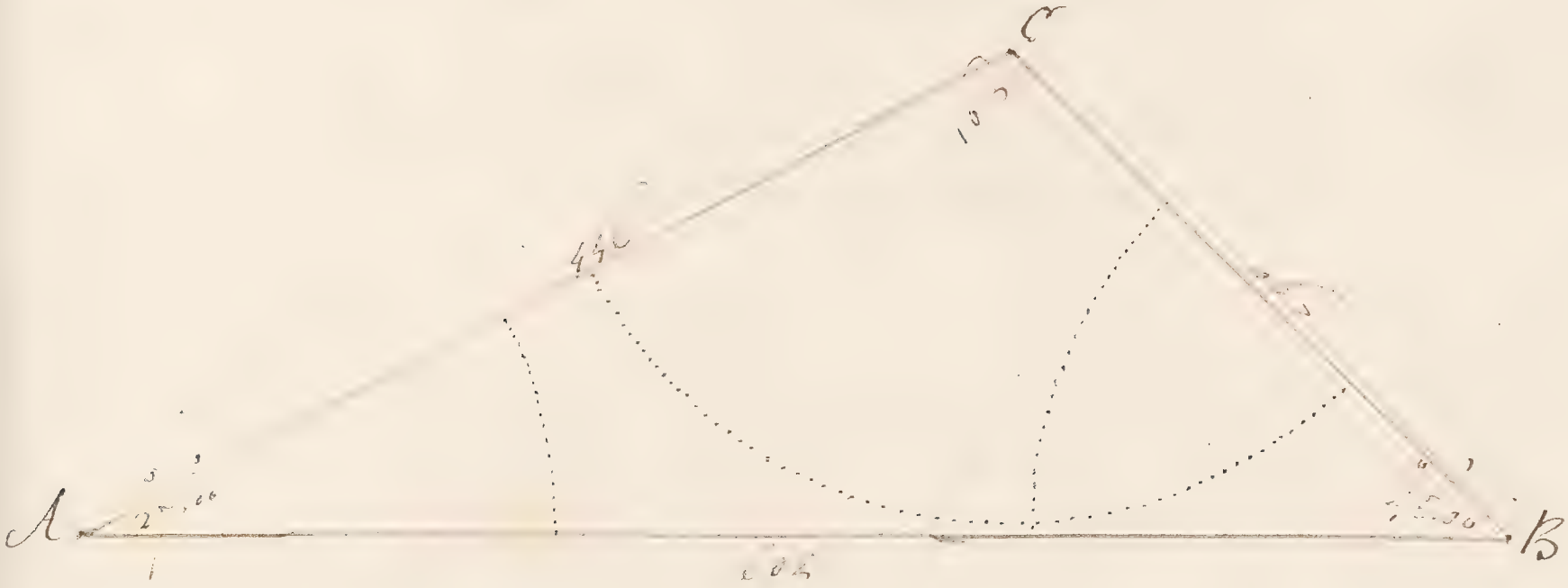
Sides A. 60°. A. C. 4/16 Angle A. 2°/00



Case IV.

Given the three Sides To find the Angles

Sides A.B. 60 A.C. 46. B.C. 40.



As Rad. ... 90° ... 10.000000

∴ Hypoth. ... 4.3 ... 2.6 1241

∴ Sine ∠ A ... 37.40 ... 9.786084

∴ Perpend. ... 2.94 ... 2.468325

As Rad. ... 90° ... 10,000000

∴ Hypoth. ... 4.30 ... 2.6 1241

∴ the Sine ∠ C ... 52.20 ... 9.789414

∴ the Base A.B. ... 3.80 ... 2.579735

Rectangular Trigonometry

& Logarithmedical

Case 1.

Given the Acute Angles and the Hypoth.
To find the Base and Perpendicular

Angles $\begin{cases} A\ 37.40 \\ B\ 52.20 \end{cases}$ Hypoth. 182

To find a Side

Any Side may be made Radius, forming your Canon upon this Rule

As the Word on the given Side
is to the given Side
So is the Word on the Side required
to the Side required

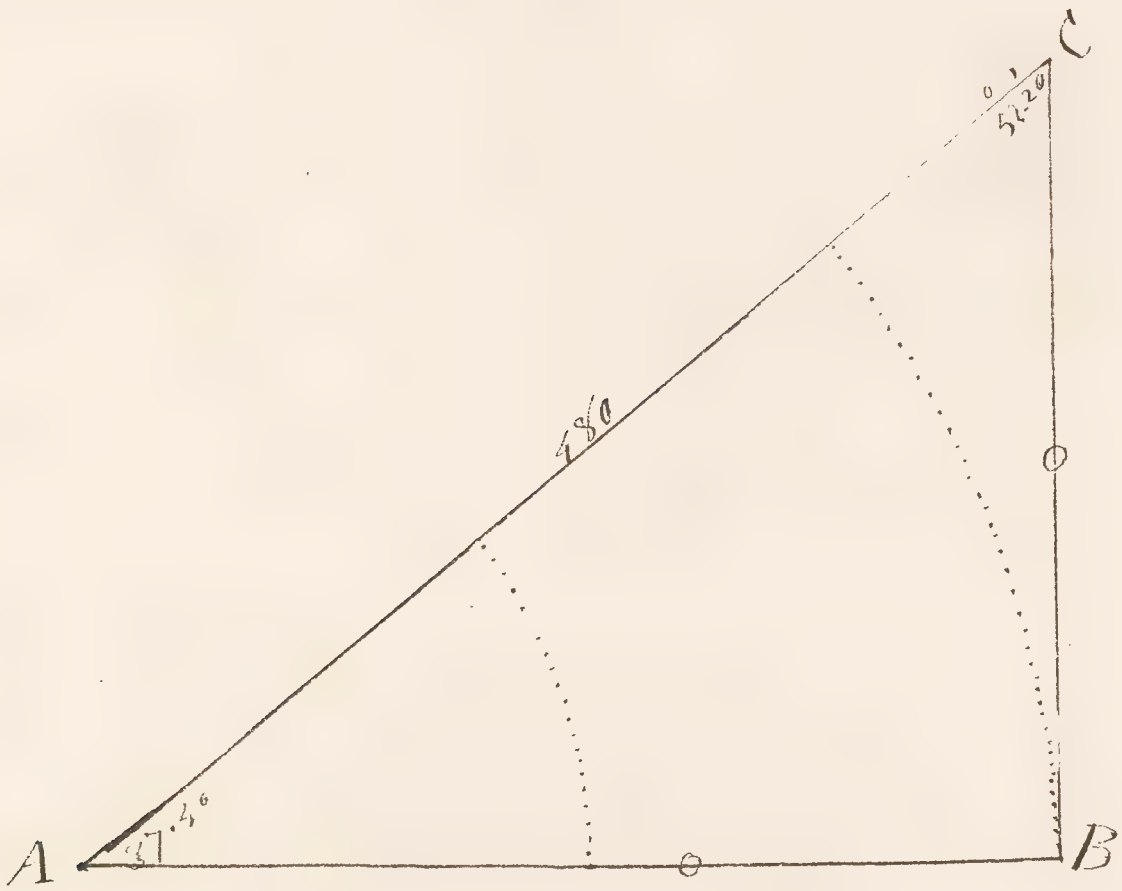
As y^e^ Secant to y^e^ Angle A 37.40		10.101506
is to y^e^ Hypoth:	480	2.683947
So is the Rad.	90,00	10.000000
to y^e^ Base	381	2.581441

As y^e^ Secant to y^e^ Angle A. 37.40		10.101506
is to y^e^ Hypoth	480	2.683047
is to y^e^ Tangent of ½ A	37.40	9.887594
to y^e^ Perpend.	294	2.469145

Case 1. Fig.r II.

Given and Required as before by Making q^

Base &c.



As y^e Secant of y^e ∠ C. ..... 52.20 ..... 10.213911

is to the Hypoth. ..... 480 ..... 2.681241

So is y^e Rad. ..... 90 ..... 10.000000

to y^e Perpend. ..... 293 ..... 2.479736

As y^e Secant of y^e ∠ C. ..... 52.20 ..... 10.213911

is to y^e Hypoth. ..... 480 ..... 2.681241

So is y^e Tangent to ∠ C. ..... 52.20 ..... 10.112406

to the Base ..... 380 ..... 2.579736

Case 1.

Given and required as before, by shewing the

corp. Ind.

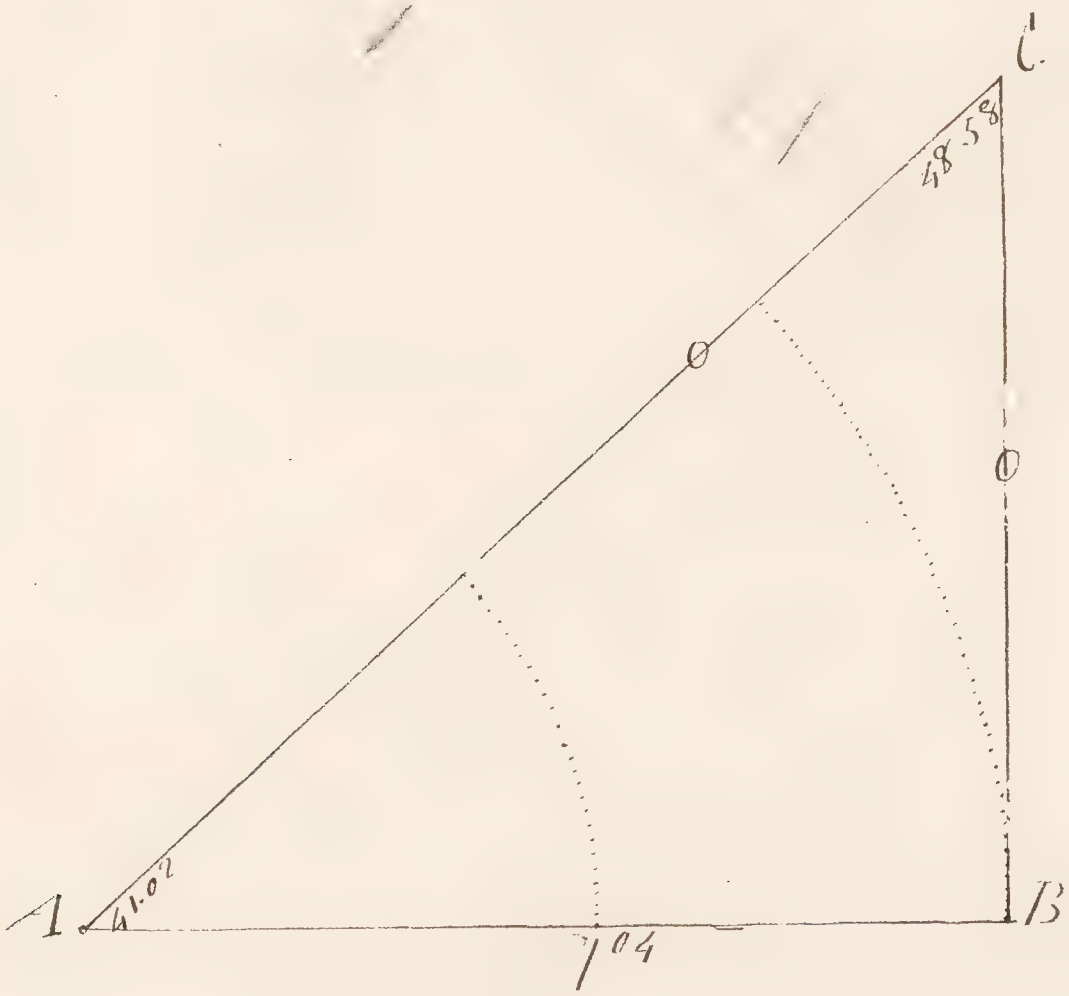
as y^e Sine of y^e ∠C ..... 48.58 ..... 9.877560
is y^e Base ..... 704 ..... 2.847573
so is y^e Sine of y^e ∠A ..... 41.02 ..... 9.817233
to y^e Perpend ..... 614 ..... 2.787246

as y^e Sine of y^e ∠C ..... 48.58 ..... 9.877560
is y^e Base ..... 704 ..... 2.847573
so is Rad ..... 90.00 ..... 10.000000
to y^e Hypoth ..... 933 ..... 2.970010

Case 11

Given and Required as before by making the

Base 104.



as y^e Tangent of y^e ∠ C ..... 48.58 ..... 10.060327

is to y^e Base ..... 704 ..... 2.847573

so is Rad. ..... 90.00 ..... 10.000000

to y^e Perpend. ..... 612 ..... 2.787243

as y^e Tangent of y^e ∠ C ..... 4858 ..... 10.060327

is to y^e Bas ..... 708 ..... 2.847573

so is y^e Secant of y^e ∠ C ..... 48.58 ..... 10.182767

is to y^e Hypoth. ..... 934 ..... 2.970013

Case II.

Given and Required as before, Shewing the

as y^e Sine of y^e ∠ A . . . . . 39.12 . . . . . 9.800737

is to the Perpend. . . . . 276 . . . . . 2.440909

so is Rad. . . . . 90.00 . . . . . 10.000000

to the Hypoth. . . . . 435 . . . . . 2.639172

as y^e Sine of y^e ∠ A . . . . . 39.12 . . . . . 9.800737

is to y^e Perpend . . . . . 276 . . . . . 2.440909

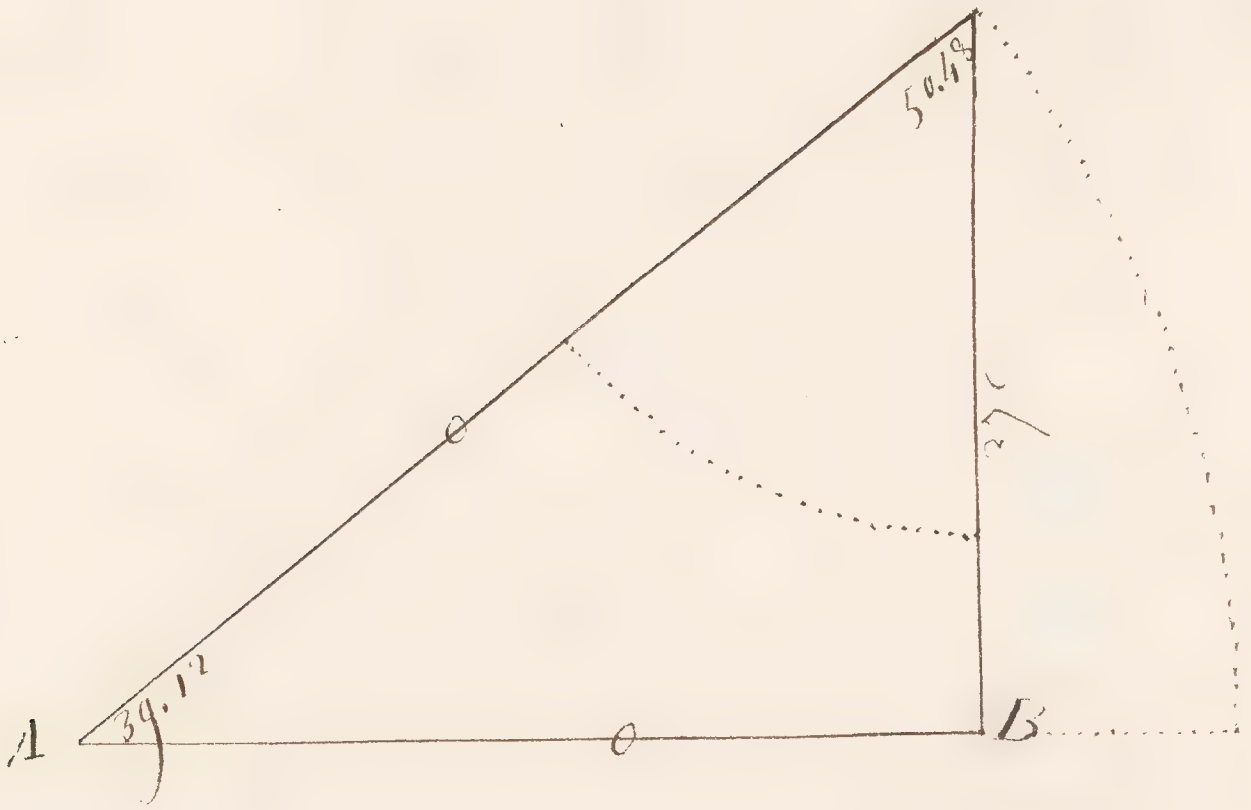
so is y^e of y^e ∠ C . . . . . 50.48 . . . . . 9.888257

to y^e Base . . . . . 338 . . . . . 2.528409

Case III.

Given the two Sides and Perpend.
to find the Base and Hypothenuse

Angles $\begin{cases} 39.12 \\ 50.18 \end{cases}$ Perpend. 276

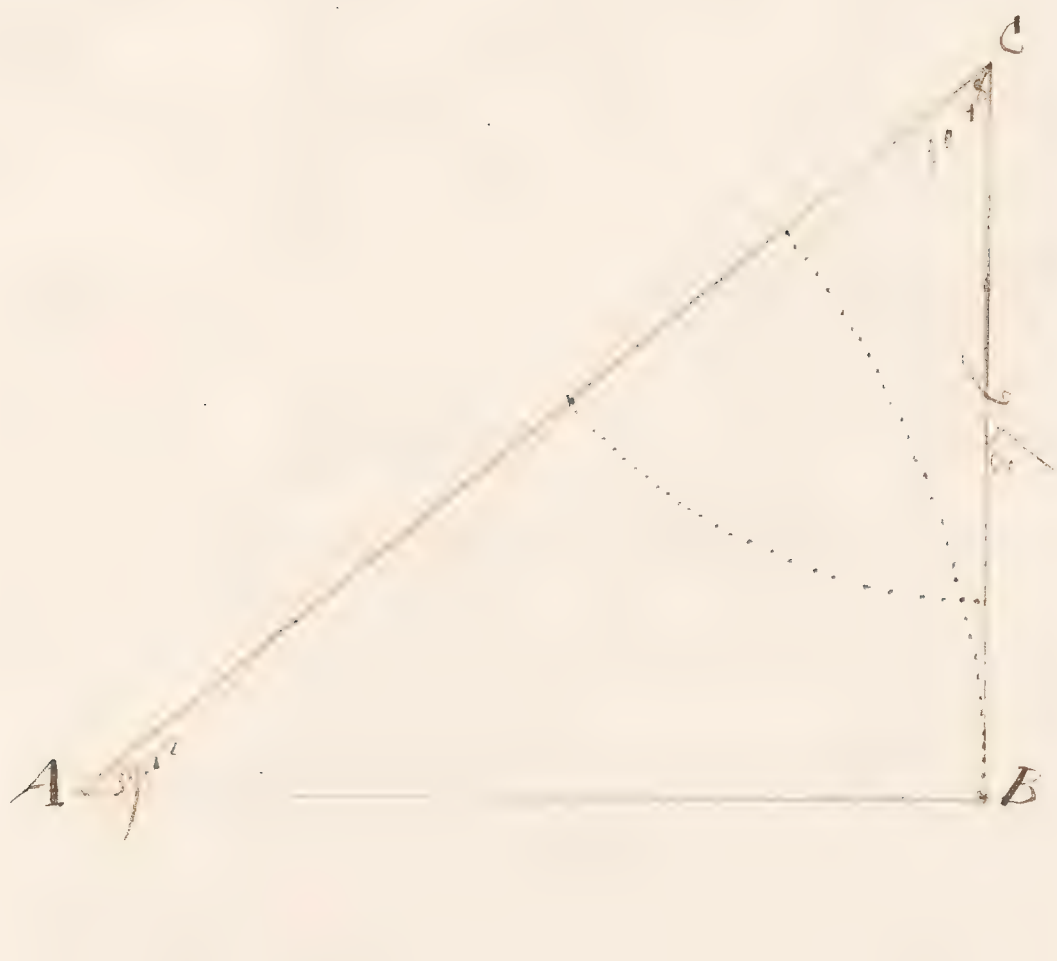


2 y Tangent of y ∠ A		5.12	9.911467
as b Expen			2.440909
so is Rad		90.00	10.000000
to y Base			12.442
as y Tangent of y ∠ A			9.911467
as b Expen		276	2.440909
so is Secant of y ∠ A		5.12	10.110729
to y Hypoth		126	2.640173

Case III.

Given and Required as before by Making the

Bond Ead.



as Rad. . . . . 90.00 . . . . . 10.000000

is to y° Perpend. . . . . 276 . . . . . 2.440909

so is y° Tangent to y° 2° . . . . . 8.24 . . . . . 10.063[illegible]

so is y° Base . . . . . 608 . . . . . 2.[illegible]

as Rad. . . . . 90.00 . . . . . 10.000000

is to Perpend. . . . . 176 . . . . . 2.440909

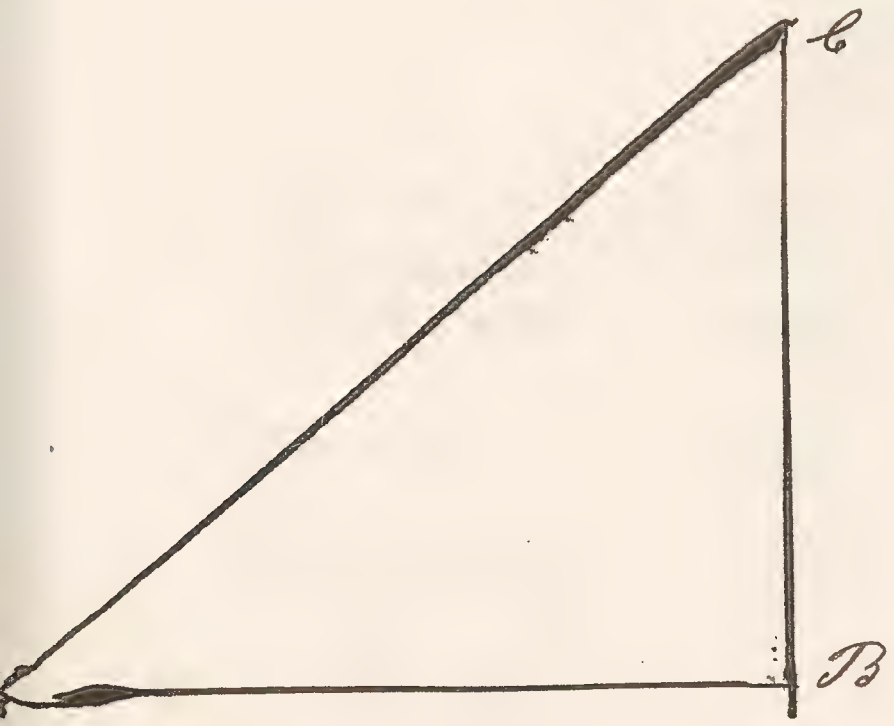
so is y° Tangent of y° 2° . . . . . 8.24 . . . . . 10.[illegible]

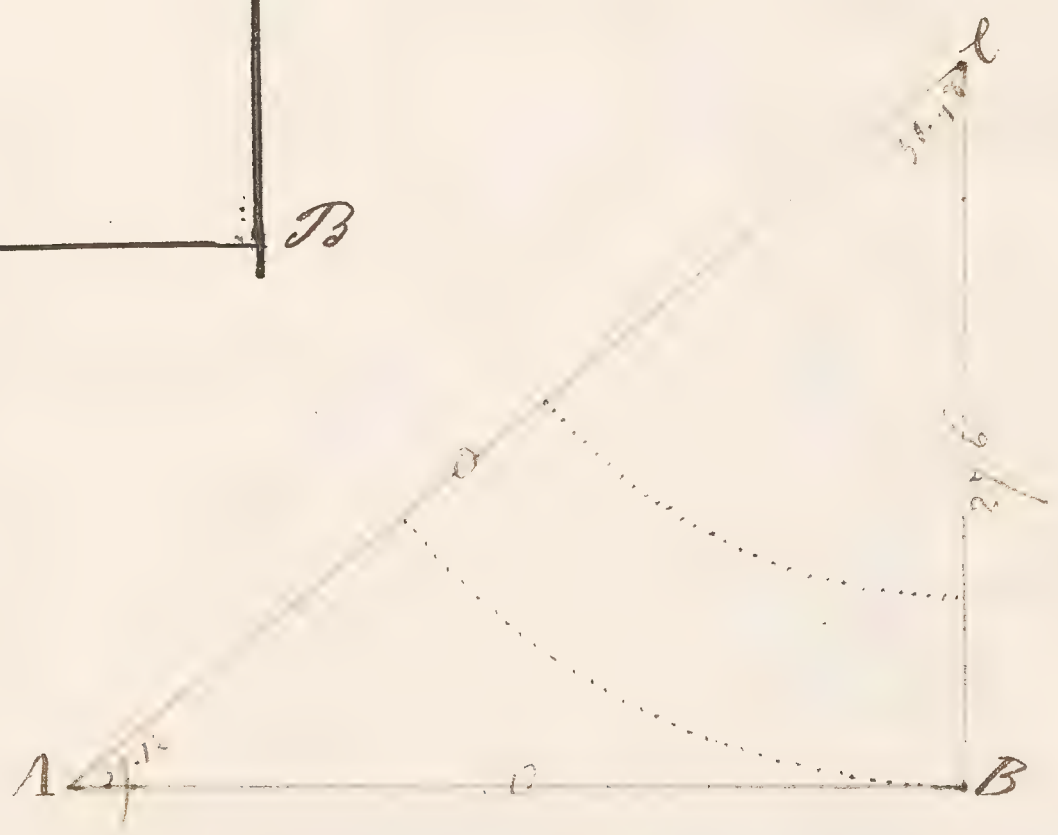
to y° Hypoth. . . . . 616 . . . . . 2.[illegible]

Case 111.

Given and Required as before by making the

Perpend. Rad.





To find an Angle

Make one of the given Sides Rad. then say

As the Side Made Rad.
is to the Rad.
So is the other given Side
to the Number upon it

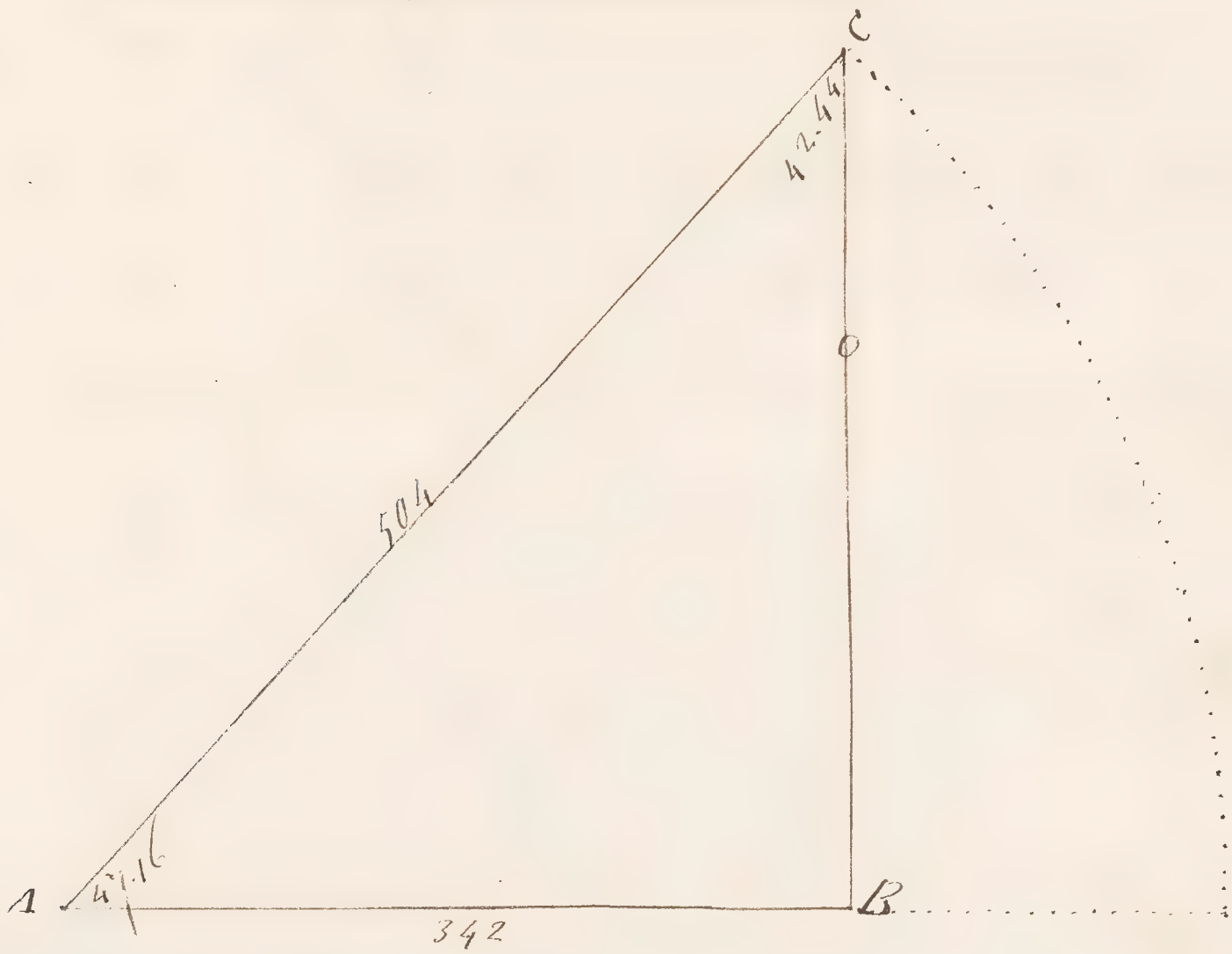
as y^e Hypoth.	504	2.702430
is to y^e Rad.	90.00	10.000000
So is y^e Base	342	2.534026
to y^e Sine of y^e ∠ C	42.44	9.831596
as y^e Sine of y^e ∠ C	42.44	9.831596
is to y^e Base	342	2.534026
as y^e Sine of y^e ∠ A	47.16	9.866004
is to y^e Perpend.	368	2.566004

Case IV.

Given the two Sides A B. and A C.
To find the Angles & Side B. C.

Sides A. B. 342 A. C. 504

Required B. C. &c.



as y^r Base . . . . . 342 . . . 2.534026

is to Rad. . . . . 90.00 . . . 10.000000

so is y^e Hypoth. . . . . 504 . . . 2.702430

to y^r Secant of y^e ∠ A. . . . . 47.17 . . . 10.166404

as Rad. . . . . 90.00 . . . . 10.000000

is to y^r Base . . . . . 342 . . . . . 2.534026

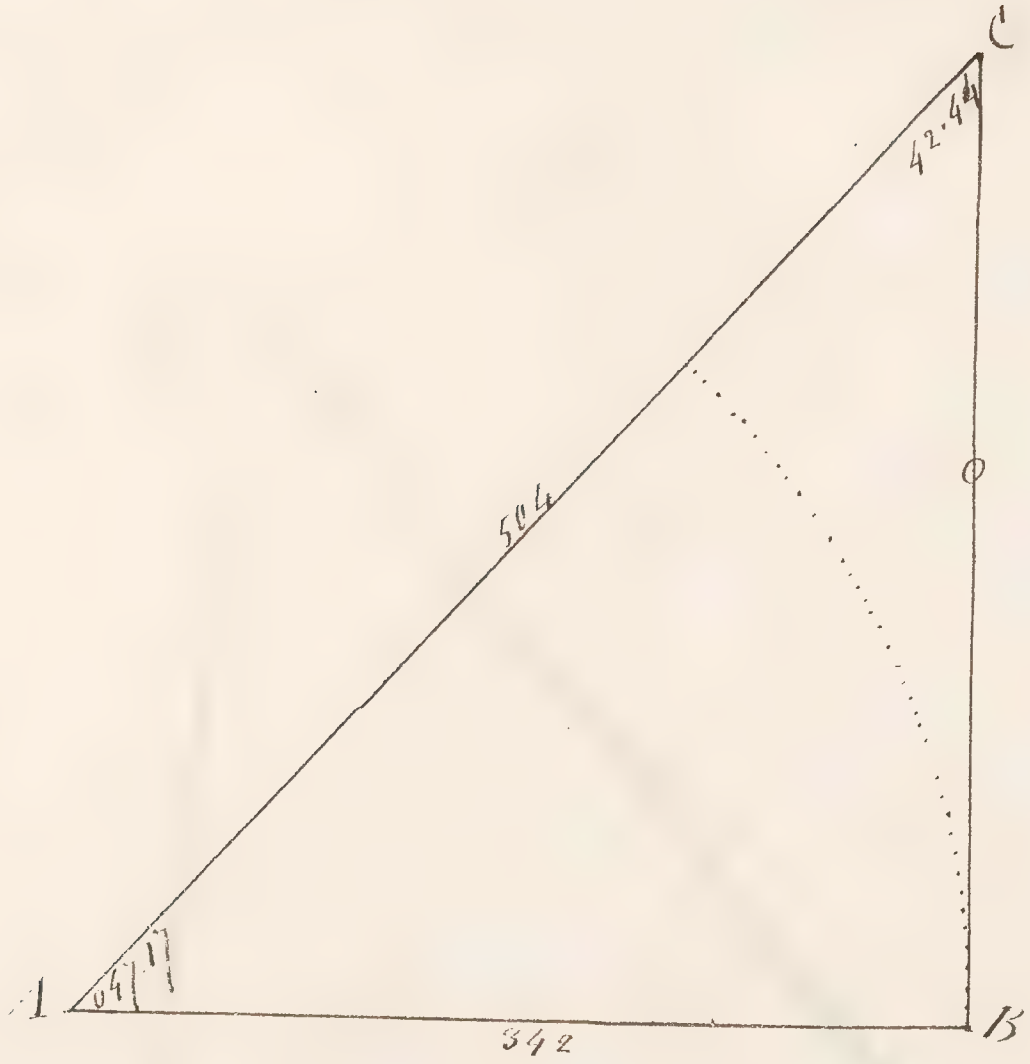
so is the Tangent ∠ A . . . . 47.17 . . . . 10.034651

to y^e Perpend. A B . . . . . 370 . . . . 2.568677

Case IV.

Given and Required as before by Making the

Bas Gad.



as ye Hypoth. . . . . 1013 . . . . 3.005609

is to Rad. . . . . 90.00 . . . 10.000000

so is ye Perpend. . . . . 742 . . . . 2.870404

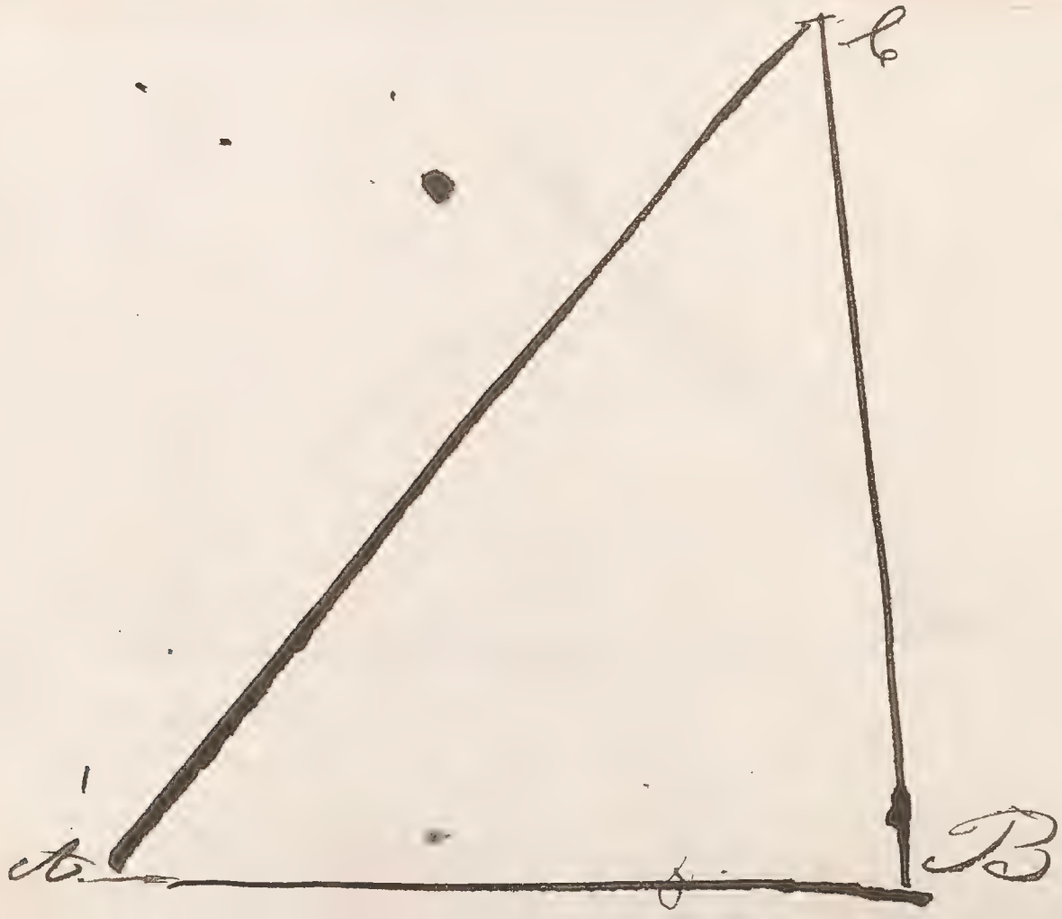
to ye Sine of ye ∠ A . . . 47.05 . . . . 9.864795

as ye Sine of ye ∠ A 47.05 . . . . 9.864716

is to ye Perpend. . . . 742 . . . . . 2.870404

so is ye Sine of ye ∠ C 42.55 . . . . 9.833105

to ye Base . . . . . 690 . . . . . 2.838793

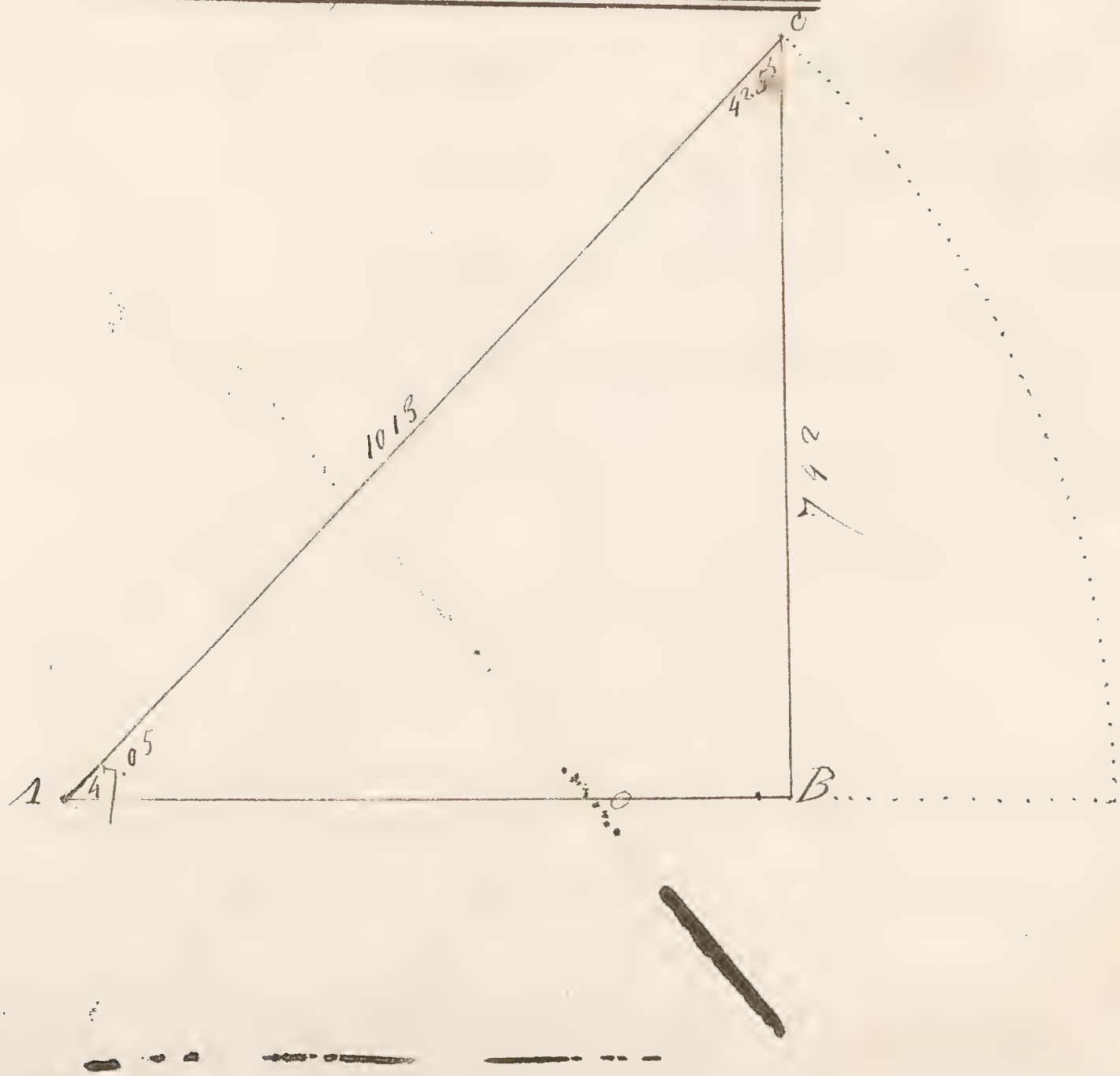


Case IV.

Given the two Sides A.C and B.C
to find the Angles and Base

Sides { AC 1013
BC 758 }

Angles
Base



as Perpend. . . . . 742 . . . . 2.870404

is to y^e Rad. . . . . 90.00 . . . . 10.000000

so is y^e Hypoth^s. . . 1013 . . . . 3.005609

to y^e Secant of y^e ∠C . . 42.55 . . . 10.135205

as Rad. . . . . 90.00 . . . 10.000000

is to y^e Perpend. . . . 742 . . . . 2.870404

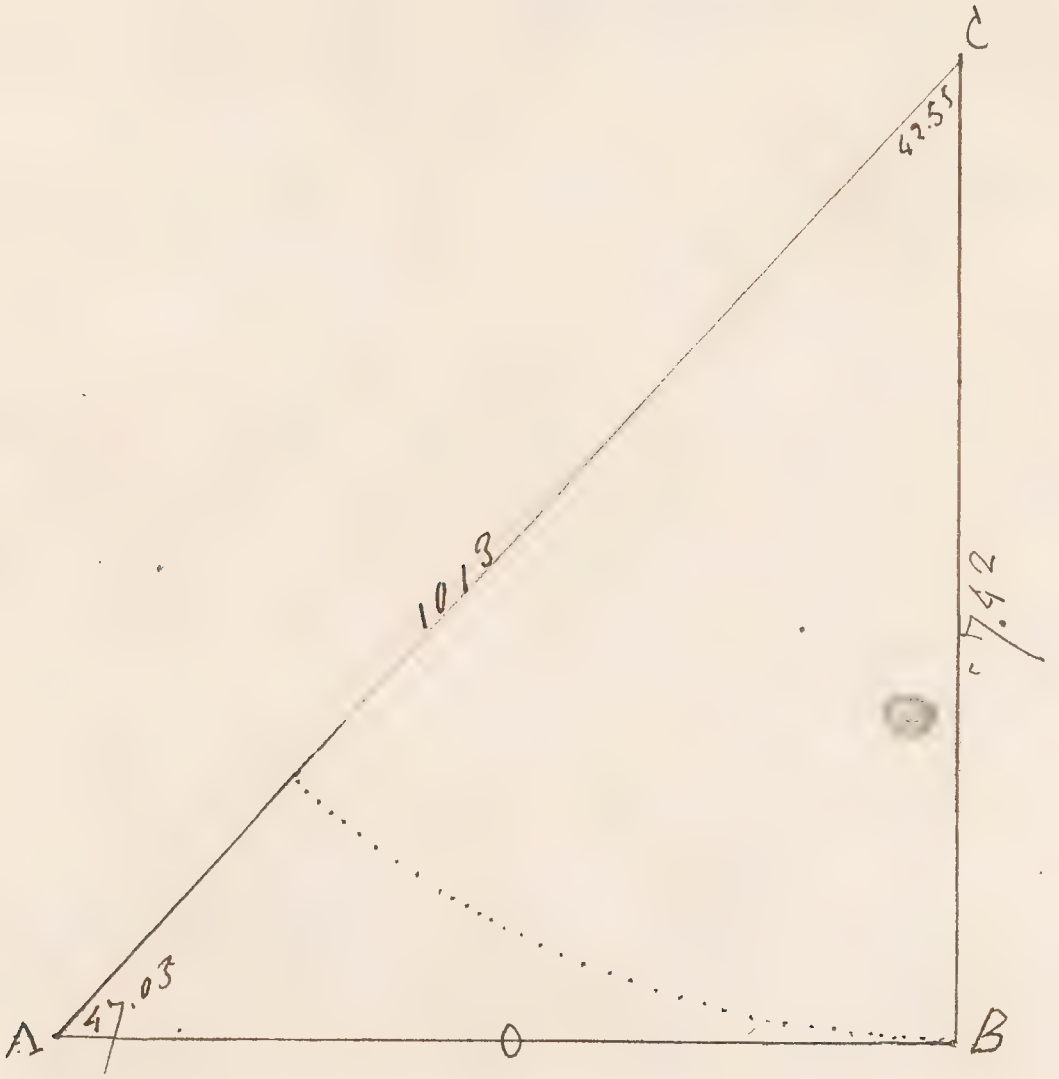
so is y^e Tangent of y^e ∠C . . 42.55 . . . . 9.960089

is to y^e Base . . . . 690 . . . . 2.833849

Case V.

Given and required as before.

Sup. Ad.



as Base . . . . . 690 . . . . 2.838849

is to Rad . . . . . ~~45.00~~ ~~90.00~~ 10.000000

so is y^e Perpend. . . . 742 . . . . 2.870404

to y^e Tangent of y^e ∠ A 47.05 . . . 10.031555

as y^e Tangent of y^e ∠ A . . . . . 47.05 . . . 10.031611

is to y^e Perpend. . . . . 742 . . . . 2.870404

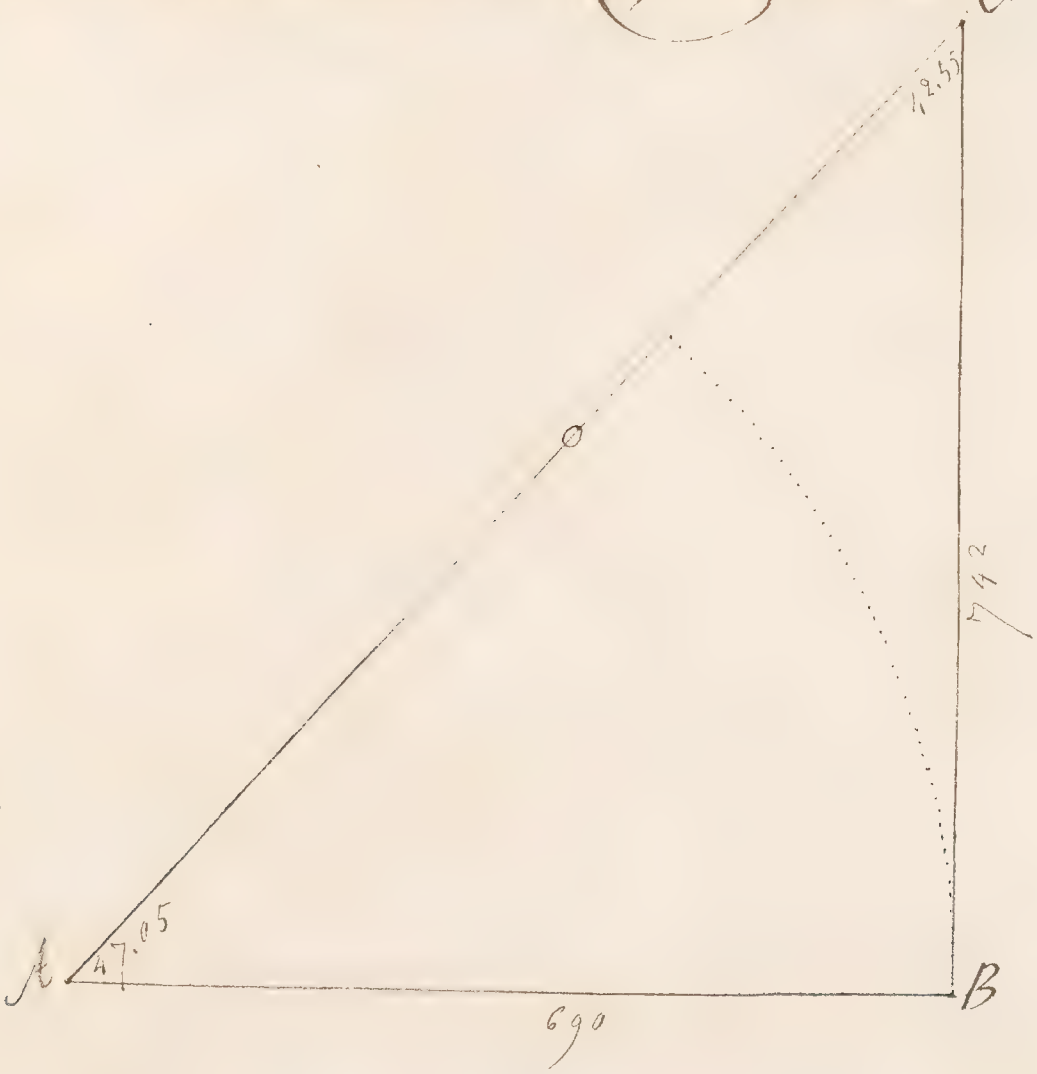
so is y^e ~~Sine~~ Secant of y^e ∠ A . . . 47.05 . . . 10.166845

to y^e Hypoth. . . . . 1013 . . . . 3.005688

Case VI

Given the Base and Perpendicular To find Plantation and Hypothenuse

Base Rod.



as Perpend. . . . . 742 = ... 2.870404

is to y^e Rad. . . . . 90.00 . . . . 10.000000

so is y^e Base . . . . . 690 . . . . . 2.838849

to y^e Tangent of y^e ∠ C . . . . 42.55 . . . . 9.968445

as Rad. . . . . 90.00 . . . . 10.000000

is to y^e Perpend. . . . . 742 . . . . 2.870404

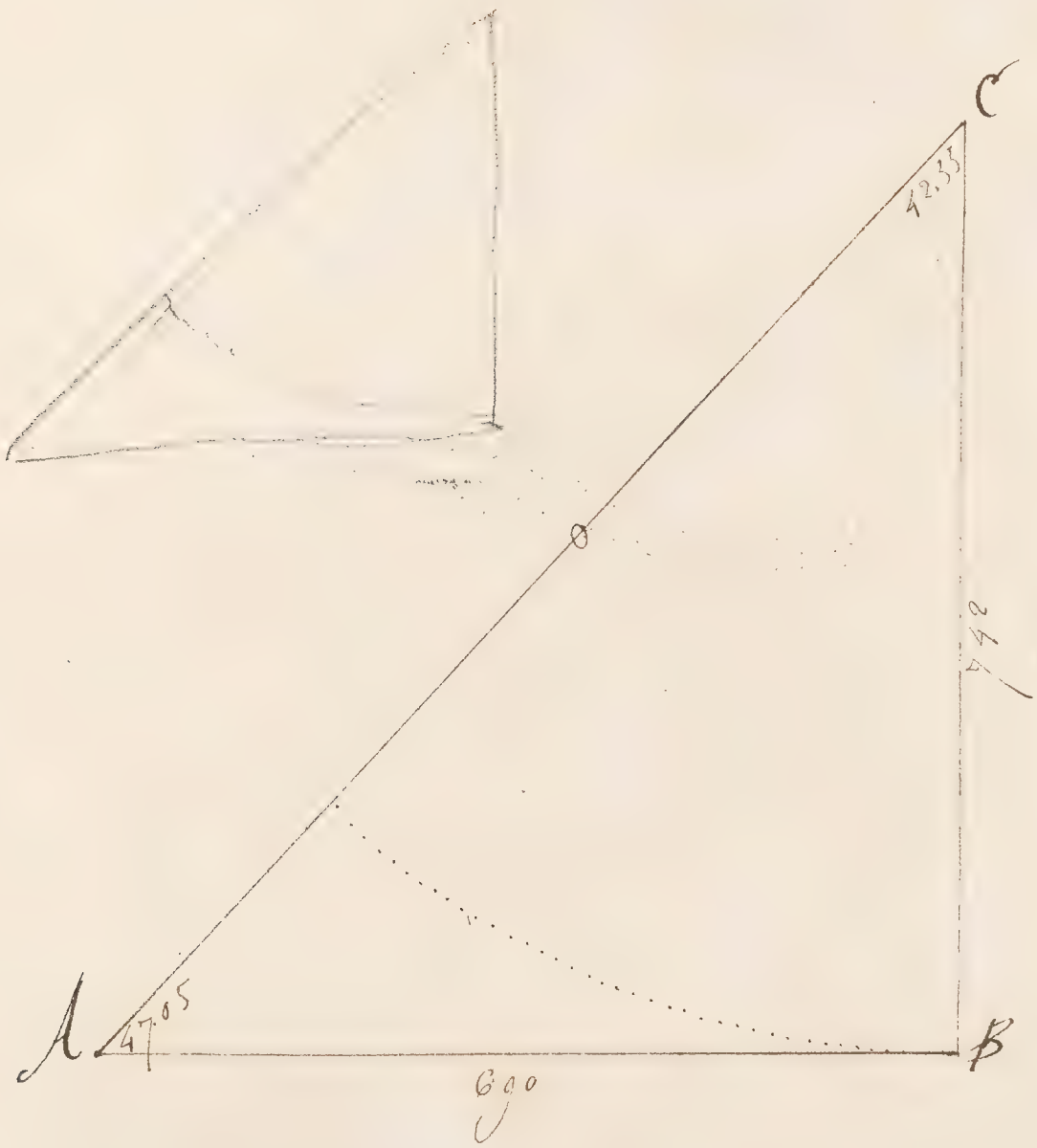
so is y^e Secant of y^e ∠ C . . . . 42.55 . . . . 10.135284

to y^e Hypoth. . . . . 1013 . . . . 3.005688

Case VI.

Given and Required a Base by Making the

erp. e.d.



Navigation.

This Art teaches how to conduct a Ship through
the pathless Ocean, from one Coast
or Place to another, the Shortest
ways, and in the shortest time possible,
to any Part of the Known World

Definitions

Latitude

Latitude is the Distance any Ship or Place is to the Northward or Southward of the Equator

Diff. of Latitude

The Diff. of Lat. of any two Places, is an Arch of the Meridian intercepted between the Parallels of those Places

Longitude

Longitude is the Distance in Degrees and Minutes any Places is East or West of the first Meridian

Diff. of Long

The Diff. of Longitude of any two Places is an Arch of the Equator intercepted between the Meridians of those Places

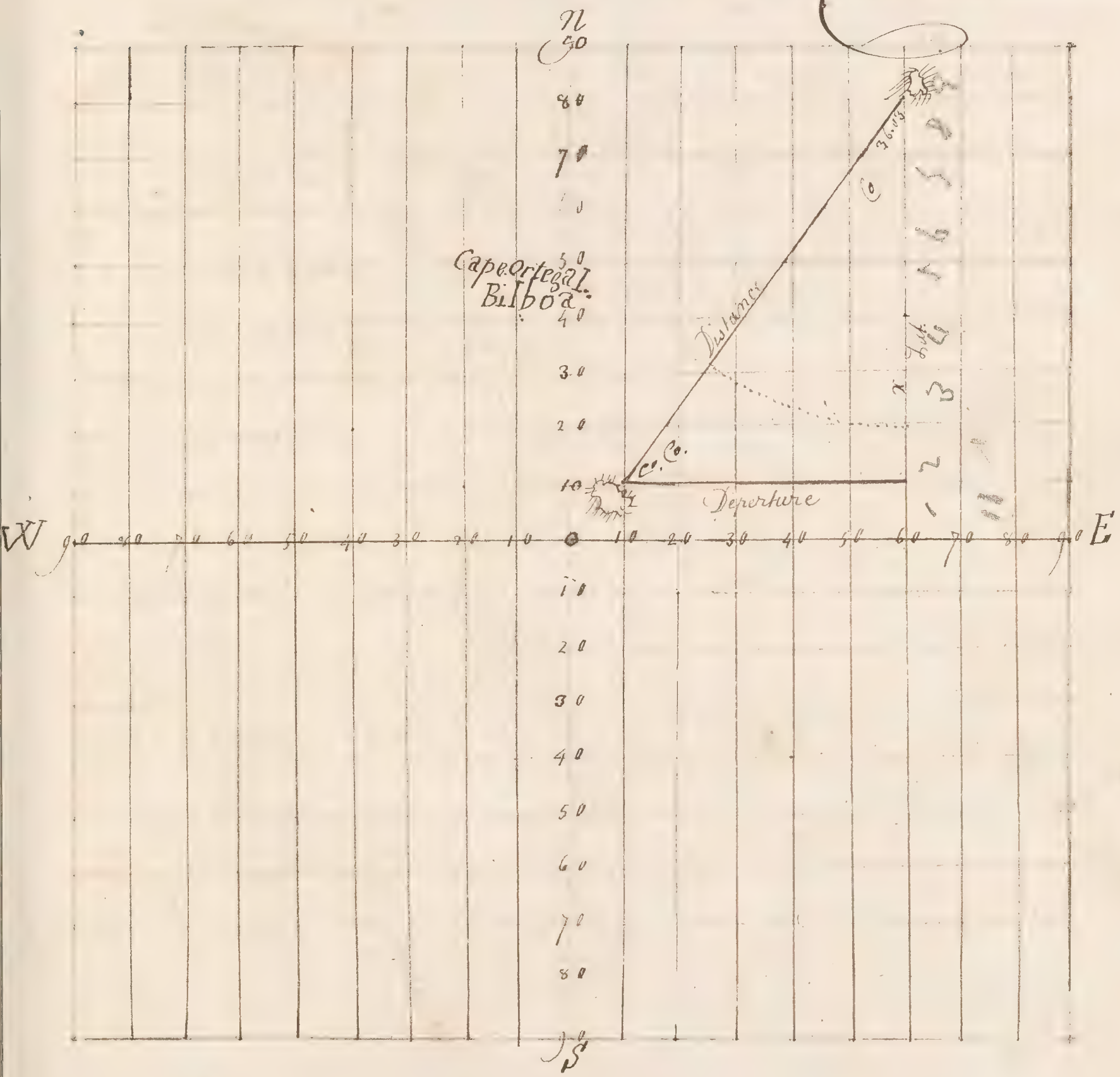
Course

Course is the Points of the Compass the Ship Sails upon reckoned from the N.o and S.o towards the East and West

Distance

The Distance is the Number of Miles or Leagues the Ship Sails upon any Points, or Course

Sailing By The Plain Chart



as y^e Secant of y^e Course - - - - 33.45 - - - 10.080154

is to y^e Distance - - - - - 447 - - - 2.650307

So is Rad. - - - - - - 45.00 - - 10.000000

to y^e Difference of Lat. - - - - 372 - - 2.570153

as y^e Secant of y^e Course - - - - - - 33.45 - - 10.080154

is to y^e Distance - - - - - - - 447 - - 2.650307

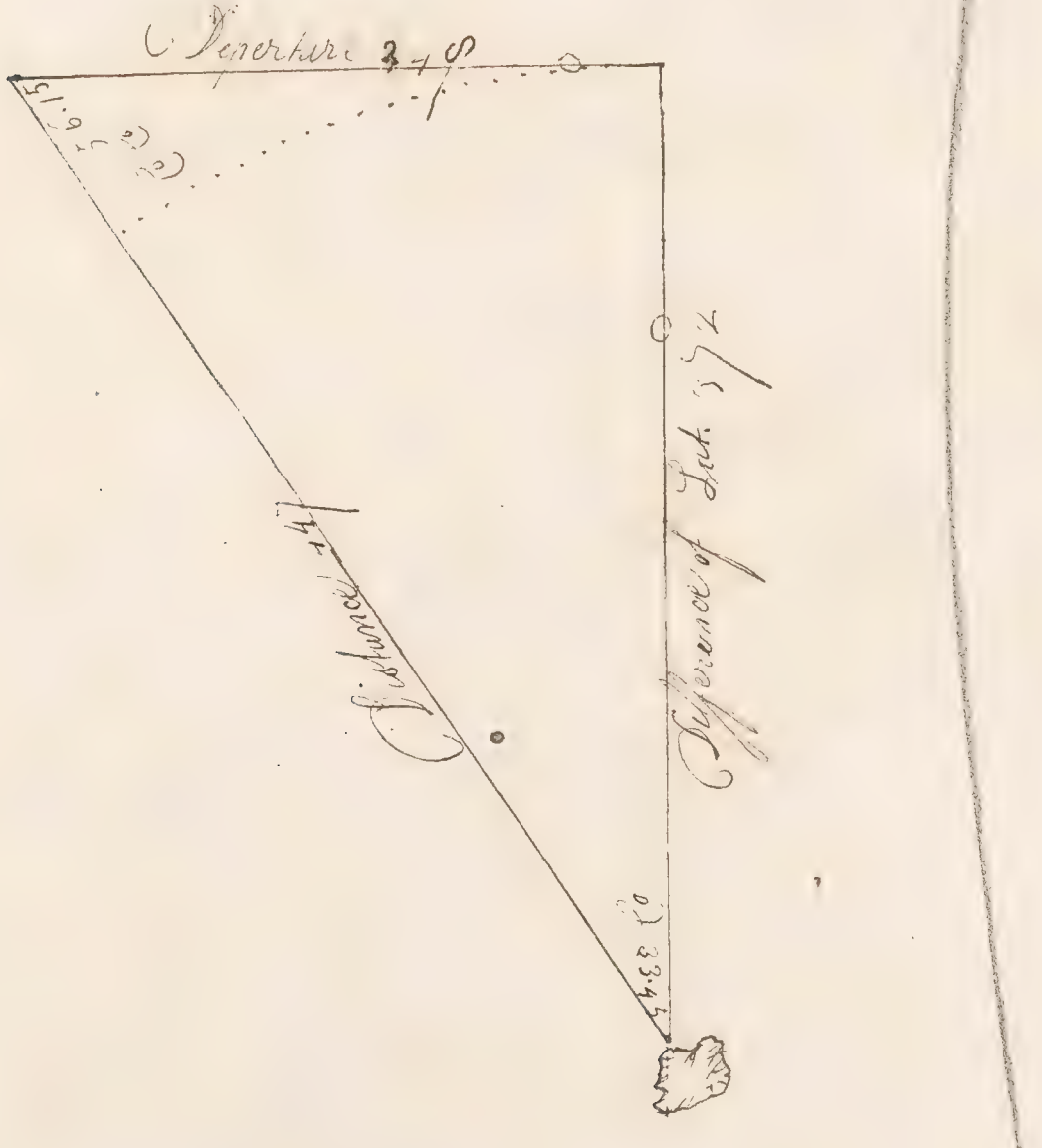
So is y^e Tangent of y^e Course - - - - - - 33.45 - - 9.824893

to y^e Departure - - - - - - - - - - 248 - - 2.3950.6

Case 1st

Given the Course and Distance
to find the Diff. of Lat. & Departure.

A Ship is bound to a Port bearing from
her N W by N distant 347 Miles — Demand
her Difference of Latitude and Departure



Separation

Latitude

	o /
Legand	50.00 No
Course to	42.11 No

as y^e Secant of y^e Course	56.15	10.255261
is to y^e Distance	844	2.926342
so is Rad.	45.00	10.000000
to y^e Difference of Lat.	469	2.671081

as y^e Secant of y^e Course	56.15	10.255261
is to y^e Distance	844	2.926342
so is y^e Tangent of y^e Course	56.15	10.175107
to y^e Departure	703	2.846188

Fig.r 2

Case 1st

Given the course and distance

To find the Diff. Lat. and Depart.

Admiralty takes her departure from the Lizard on the coast of England, and sails S.W.B.S. 84 Miles — Required her departure and latitude come into ———

Preparation

	Lat.
Bermudas	32 30 N.
Come into	27.14 N.
	5.16
	60
	316

as	Rad.	45.00	10.000000
is to	y° x Lat	316	2.499687
so is	y° Tangent of y° Course	33.45	9.824893
to	y° Departure	212	2.324580

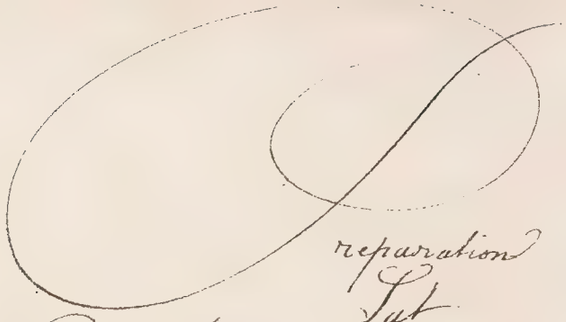
as	Rad.	45.00	10.000000
is to	y° x Lat.	316	2.499687
so is	y° Secant of y° Course	33.45	10.077645
is to	y° Distance	378	2.577332

Fig. 1

Table 2nd

From the corrected Latitude
and Meridian Dist. and Departure.

Course Steered from Bermudas one of the Bahama
Islands Wells S.S.W. till by Observation Shoals
found in the Latitude of 27° 14' N. and Longitude
per Distance Sailed and Departure from the Meridian.



reparation
Sat

Come from 8.20 No
Come into 7.14 So
15.34
.60
934

as y^e Sine C^o to C^o of y^e Course . . . 35.45 . . 9.744739
is to y^e x Sat. . . . . 934 . . 2.970947
so is y^e Sine of y^e Course . . . . . 56.15 . . 9.922355
is to y^e Departure . . . . . 1406 . . 3.147963

as y^e Sine C^o to C^o of y^e Course . . . 35.45 . . 9.744739
is to y^e x Sat . . . . . 934 . . 2.970947
so is Rad. . . . . 90.00 . . 10.000 000
to y^e Distance . . . . . 1681 . . 3.225608

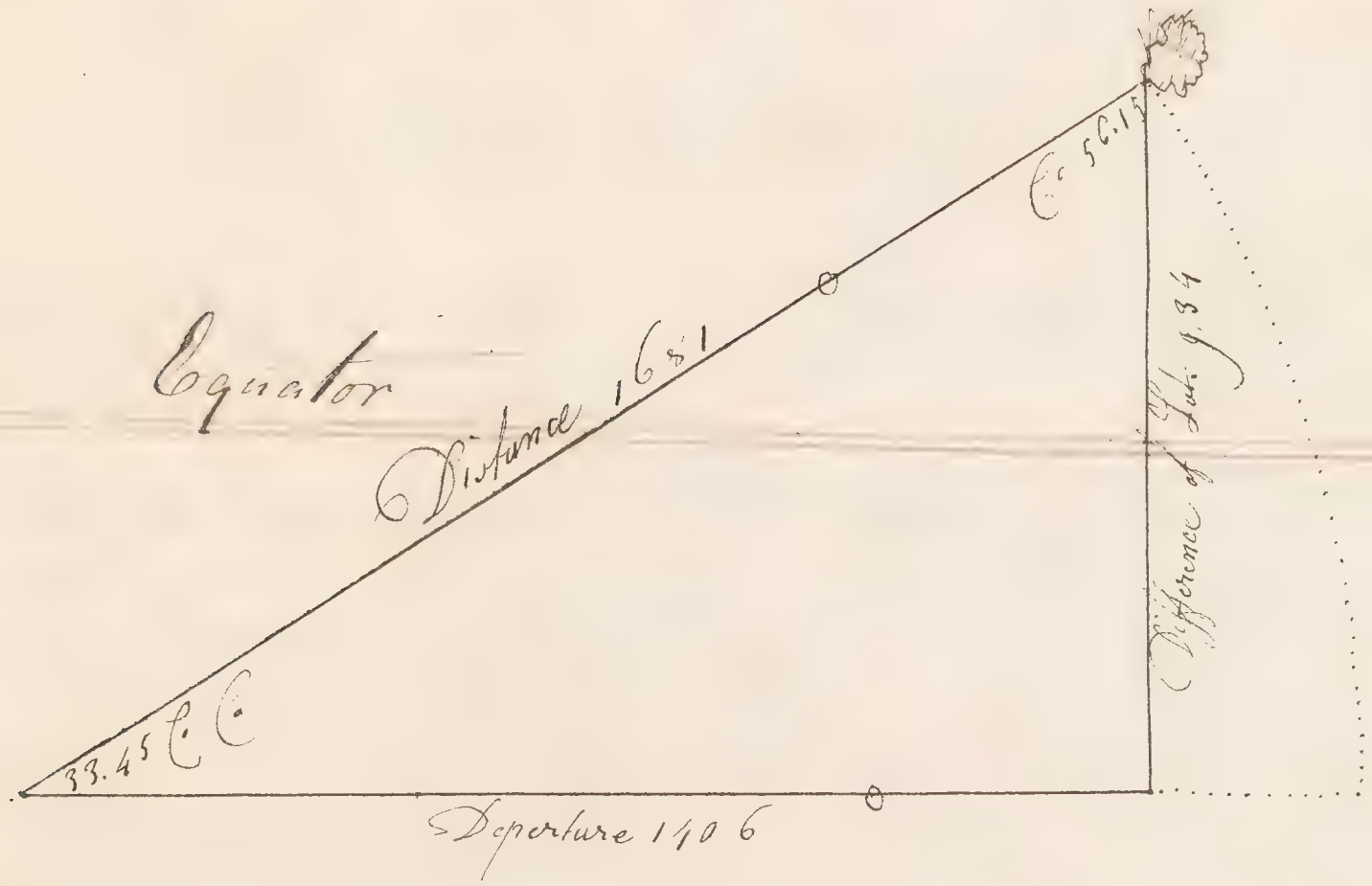
Fig. 2

Cast 2nd

Given the Course and Diff. of Latitude.

To find the Distance and Departure

I Admit a Ship from the Lat. of 5° 20 N°.
Waits at Sea till the Sun Observation is found
in the Latitude of 9° 14' N°. Demand
her Distance Sailed and Course and Departure from
the Meridian; also the Latitude of y Departure



reparation.

St. Jago
come into

Lat
15.20 No
00.16 No.

Gol 904
15.04 So
Diff. 15.20 No.
00.16 N.

as y^e Tangent of of Course . . . . . 33.45 . . 9.824898

is to Departure . . . . . 604 . . . 2.781037

so is Rad. . . . . 45 . . 10.000000

is to y^e x Lat. . . . . 904 . . . 2.956144

as y^e Tangent of y^e Course . . . . 33.45 . . 9.824898

is to y^e Departure . . . . . 604 . . . 2.781037

so is y^e Secant of y^e Course . . . . 33.45 . . 10.080154

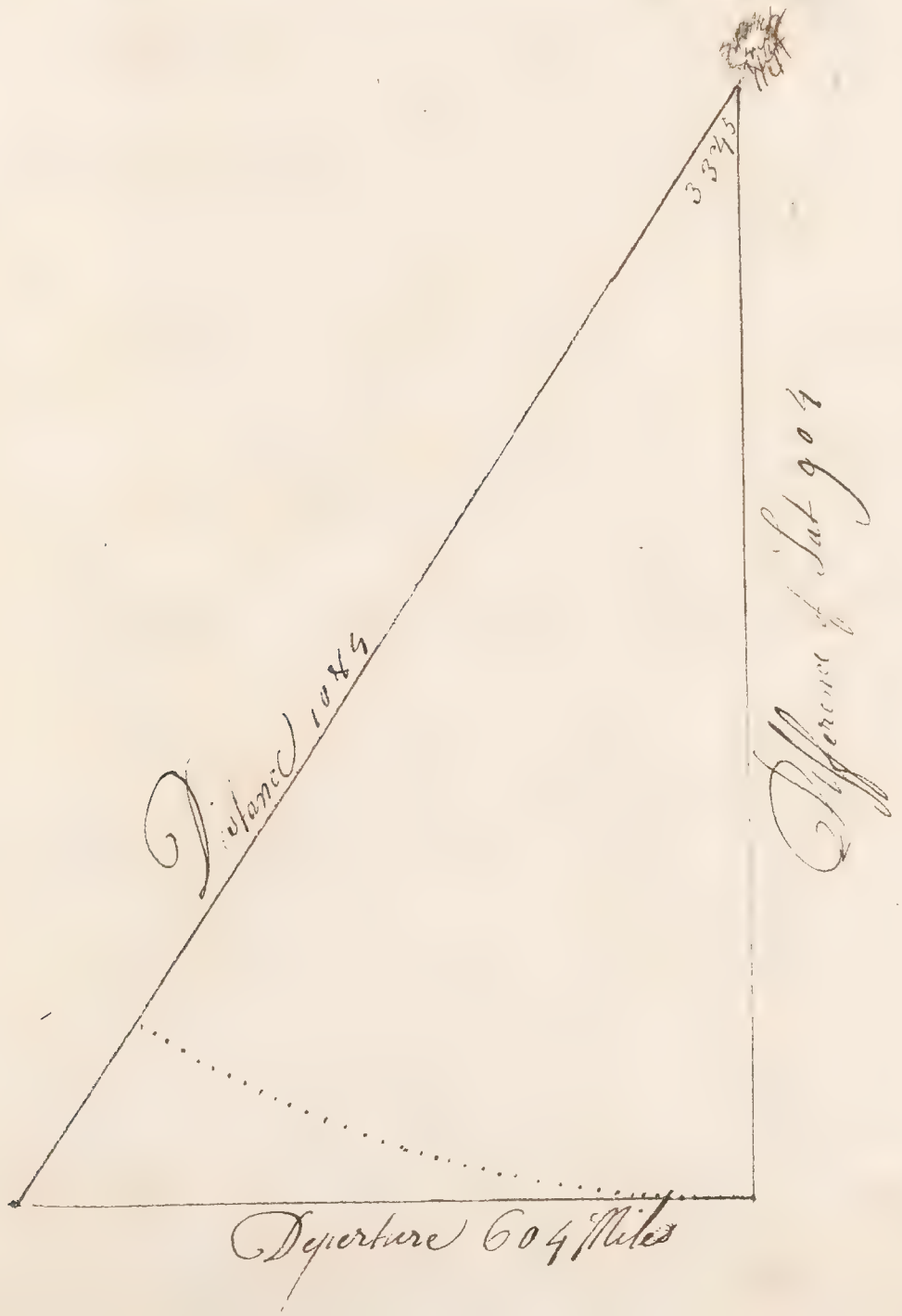
to y^e Distance . . . . . 1084 . . . 3.036289

Case 3

Given the Course and Departure?

To find the Distance & Lat.

A Ship from C.t Jago / one of the Cape de Verds / Sails S.W.b.W. the Departure is 604 Miles W.t — Demand her Distance and Latitude come into



Dep. Lat
Corr from 4.17 S.
Diff. 10.69 S.
Corr into 14.26 S.

D/Co/g
10.69

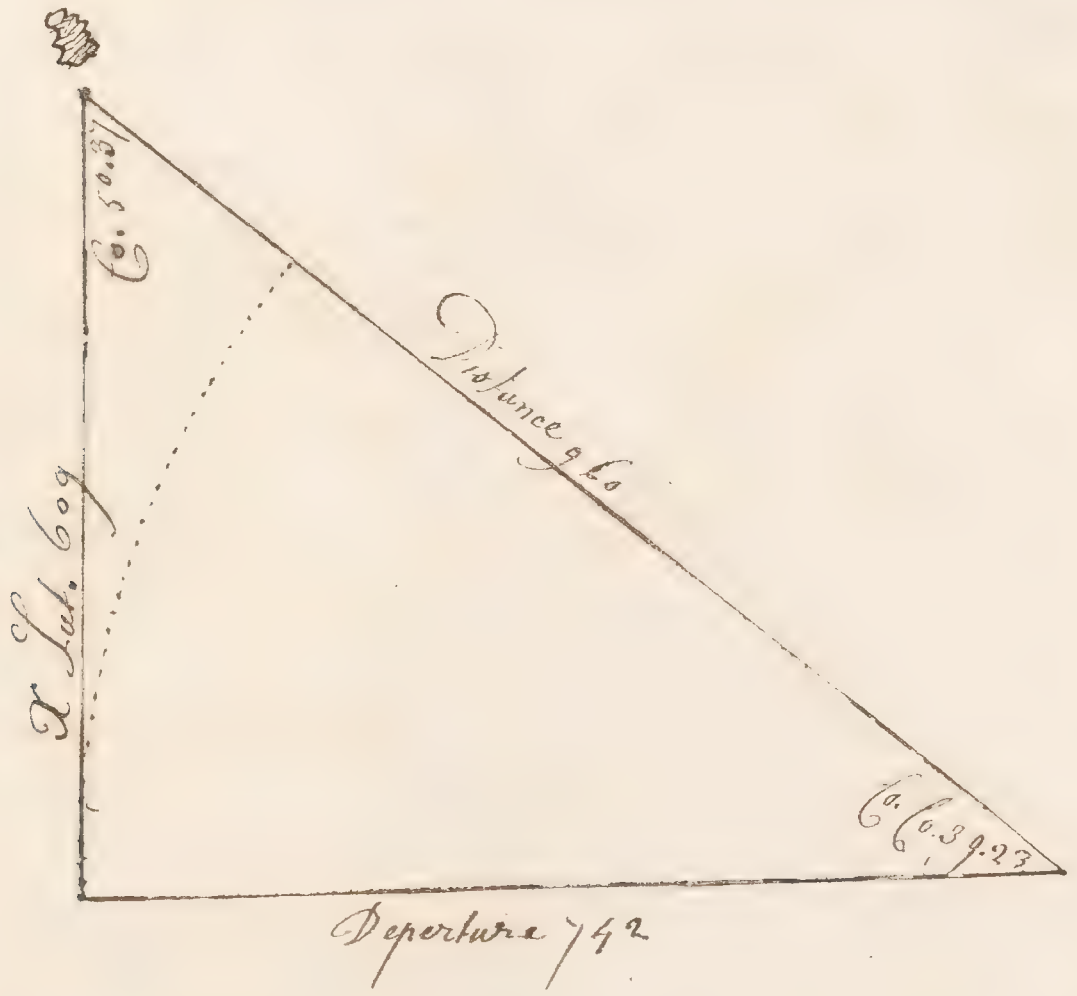
as Rad.	° ′ 45.00	10.000000
is is to y^{e} Departure	742	2.870404
so is y^{e} Tangent of y^{e} C. Co. Course	39.13	9.914309
is to X Lat	609	2.784713

as Rad.	° ′ 45.00	10.000000
is to y^{e} Departure	742	2.870404
so is y^{e} Secant of y^{e} C. C. Course	39.23	10.111867
to y^{e} Distance	960	2.982271

Task 3

Given the Course and Departure
To find the Distance and Latitude

Admits a Ship from one Island situated in Lat. 17° 15' N
Sailed S.E. by E. her Departure is 74 Miles
Course ? Demand her Distance Sailed and
Latitude arrived to



Reparation

Antegoa.

Lat	
17. 25 No.	
21. 14 No	
4.49	
60	
289	

as r° X Lat	289	2.460898
is to r° Rad.	45.00	10.000000
so is y° Distance	504	2.702439
to y° Secant of y° Course	55.01	10.241589
as Rad.	45.00	10.000000
is to y° X Lat.	289	2.460898
so is y° Tangent of y° Course	55.01	10.155042
is y° Departure	413	2.615940

Departure 413

Dist. Sailed

055.01°

Distance 504

Separation

Lat

Cape St. Vincent 37.06 No.

Came to 42.30 No.

5.24

60

324

as x Lat	324	2.510545
is to 7° Rad.	45.00	10.000000
so is y^e Distance	428	2.631444
to y^e Secant of y^e Course	40.47	10.120899

as Rad	45.00	10.000000
is to y^e x Lat	324	2.510545
so y^e Sargent of y^e Course	40.47	9.935844
is to y^e Departure	279	2.446389

Fig^re 2

East 4.th

Given the Diff. Lat. and Distance

To find the Course and Departure.

Admit a Ship from Cape St. Vincents for the Coast of Portugale, Sails 428 Miles between the N.e and the West, at which time She is come to the Lat. of 42°. 30′ N.o Demand her Course and Distance?

Preparation.

Lat

Flores 39:40 No
Diff. 15.38 No
Come to 55.18 No

90/9 3/8
15.38

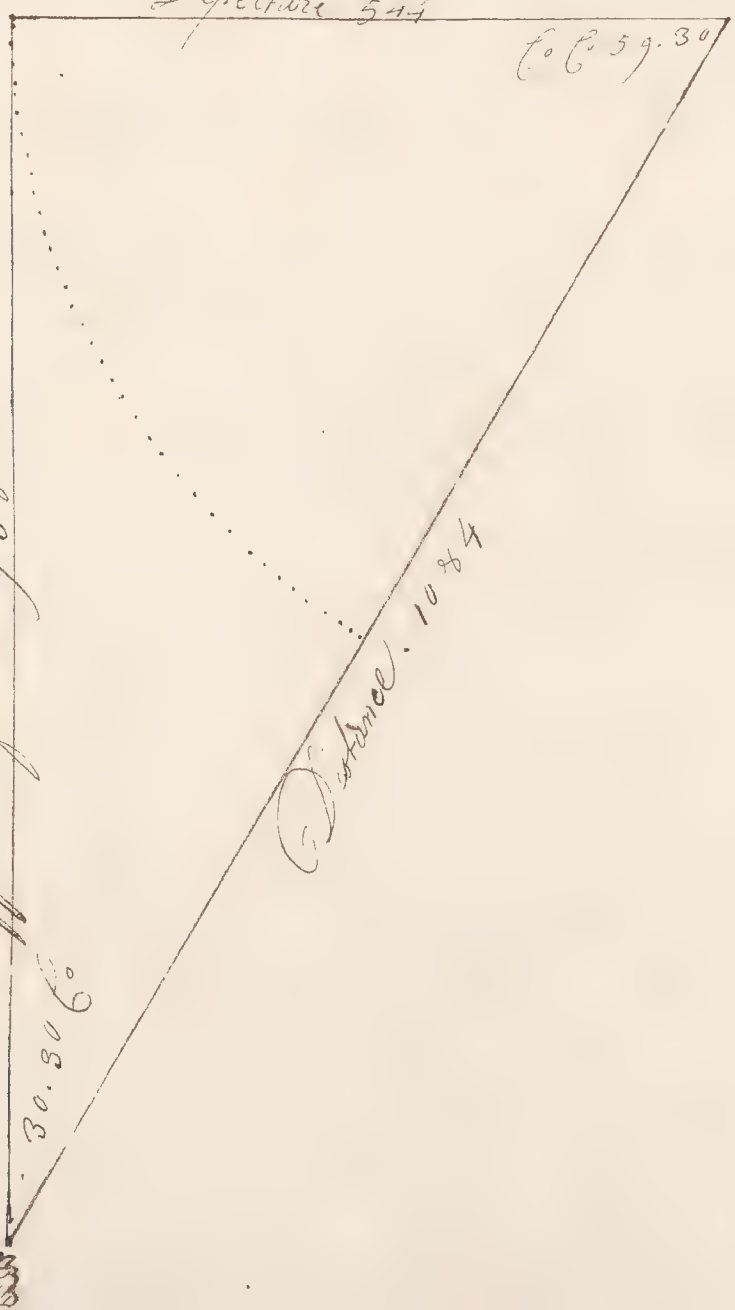
as y^e Departure . . . . . 544 . . . 2.735599
is to y^e Rad. . . . . 45.00 . . . 10.000000
so is y^e Distance . . . . . 1084 . . . 3.035029
to y^e Secant of y^e Co Course . . . . . 59.53 . . . 10.299430

as Rad. . . . . 45.00 . . . . 10.000000
is to y^e Departure . . . . . 544 . . . . 2.735599
so is y^e Tangent Co. Co. . . . . 59.53 . . . 10.236521
is to y^e Diff. of Lat . . . . . 988 . . . . 2.972120

Nov 5th

Given the Distance and Departure
To find the Course and Diff. Latitude.

Sept 1st a Ship from Flores one of the Western
Islands Sails 1084 Miles between the 1st
and 5th at which time her Departure is 544 —
Required her Course and Dist. Come into



Preparation.

Sat

Flores 39.40 No
Come to 30.18 No
9.22
60
562

as y^e Departure	508	2.705864
is to y^e Rad	45.00	10.000000
so is y^e X Sat	562	2.749736
is to Tangent of y^e C.C. of y^e Course	47.55	10.043872

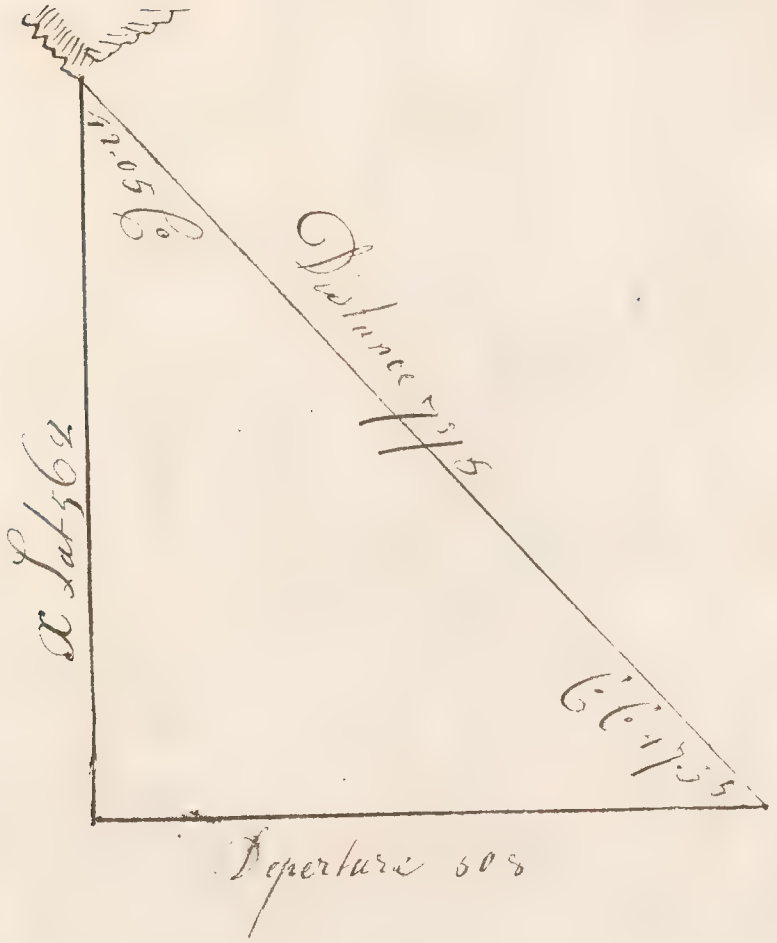
as Rad	45.00	10.000000
is to y^e Departure	508	2.705864
so is y^e Secant C.C. of y^e Course	47.55	10.173590
to y^e Distance	775	2.889463

Course S E B S 3/4 E

Case 6.th

Given the Diff. Lat. and Departure
To find the Course and Distance

Admiral Ships from the Island off Flores
as before Sails between the South and East
till She comes into the Lat. of 30.18 N.o at which
time her Departure is 608 Miles / Required
her Course and Distance



Preparation.

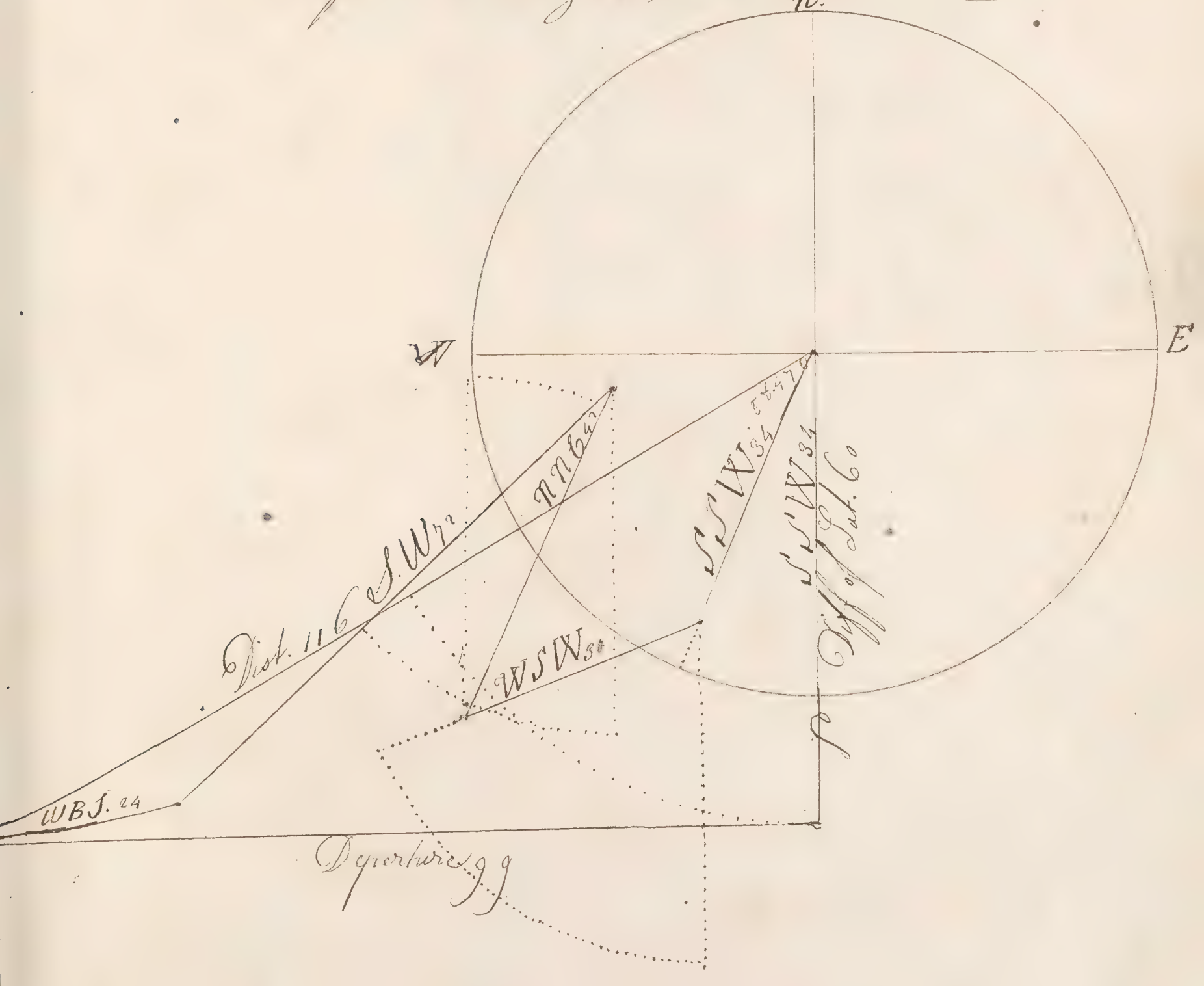
Lat
Diff. 1.00 So.
Come into 41.42 No

			x Lat.		Depart.	
Course	Dist.	points	No.	So.	E.	W.
SSW	34	2	...	31.4	...	13.0
WSW	30	6	...	11.5	...	27.7
NNE	42	2	38.8	...	15.7	...
SW	72	4	...	50.9	...	50.9
WBS	24	7	...	4.7	...	23.5
			38.8	98.5	15.7	115.1
				38.8		15.7
				59.7		99

as x Lat	60	1.77815 1
is to y^e Rad.	45.00	10.00000
so is y^e Departure	99	1.99563
to y^e Tangent of y^e Course	58.47	10.21748
as Rad.	45.00	10.00000
is to x Lat	60	1.77815
so is y^e Secant of y^e Course	58.47	10.28543
to y^e Distance	116	2.06359

Plain Traverse

Admit a Ship takes her Departure from an Island in Lat 42. 42 N° and Sails the following Courses (Viz) SSW 34 Miles WSW 30 N 91 & 42. SW 72 and W BS 24 — I Demand her Course, Distance and Depart. made good, and Latitude Come into



Preparation!

Sat

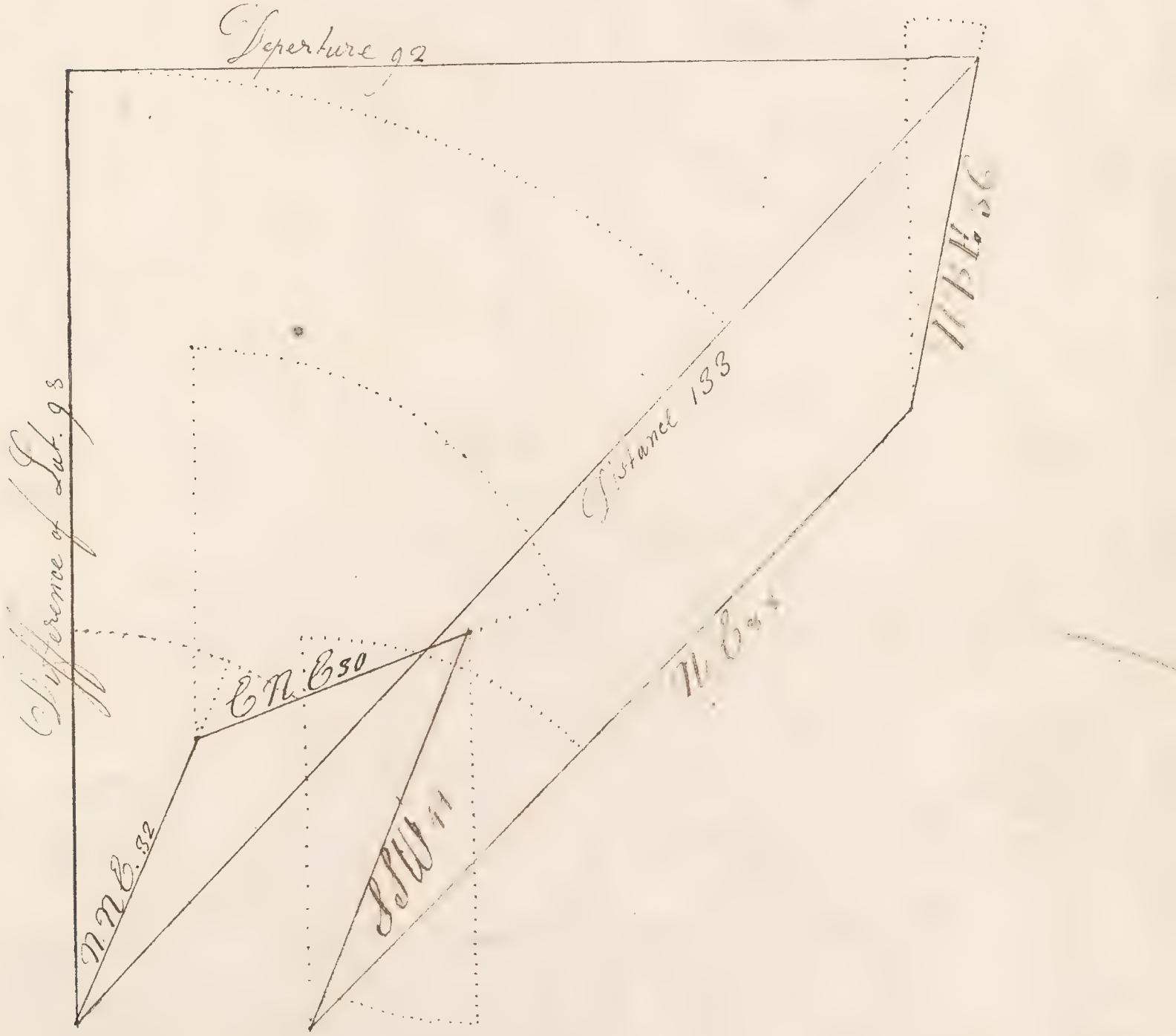
Bermudas 32.30 No
Diff. 1.38 No
Sm. ... 34.18

					Sat.	Dept.
Course	Dist.	Links	No.	So.	E	W
NNE	32	2	29.6	...	11.3	...
ENE	31	6	11.5	...	29	...
SSW	11	2	...	10.9	...	1.6
N E	11	1	6.2.2	...	6.1	1..
NBE	36	1	353	...	16.9	...
			104.6	40.7	69.1	16.7
			10.7		16.2	
			17.9		2.2.3	

as R Sat ..... 98 ... 1.9 8 2 7 1
is to y^e Rad. ..... 45.00 ... 10.000000
so is y^e Departure ..... 92 ... 1.963788
to y^e Tangent of y^e Course ..... 43.47 ... 9.98151 i
as Rad. ..... 45.00 ... 10.000000
is to x Sat ..... 9^2 ... 1.9 3 2 2 9 1
so y^e Tangent of y^e Course ..... 43.47 ... 10.141486
y^e Distance ..... 133 ... 2.128357

2nd Travers

Admiralty Ship from Bermudas fore of the Bahama Islands / sails the following Courses (viz.)
N N E 32 Miles E N E 30 S S W 11 N W 88 N N E 36
Required her Course, Distance, and Departure
Made good, also the Latitude She is come into



Preparation.

Lat

Cape Clear 51.10 No
Diff 1.46
Come into 52.56

60/10/6
1.46

x Lat. Depart.

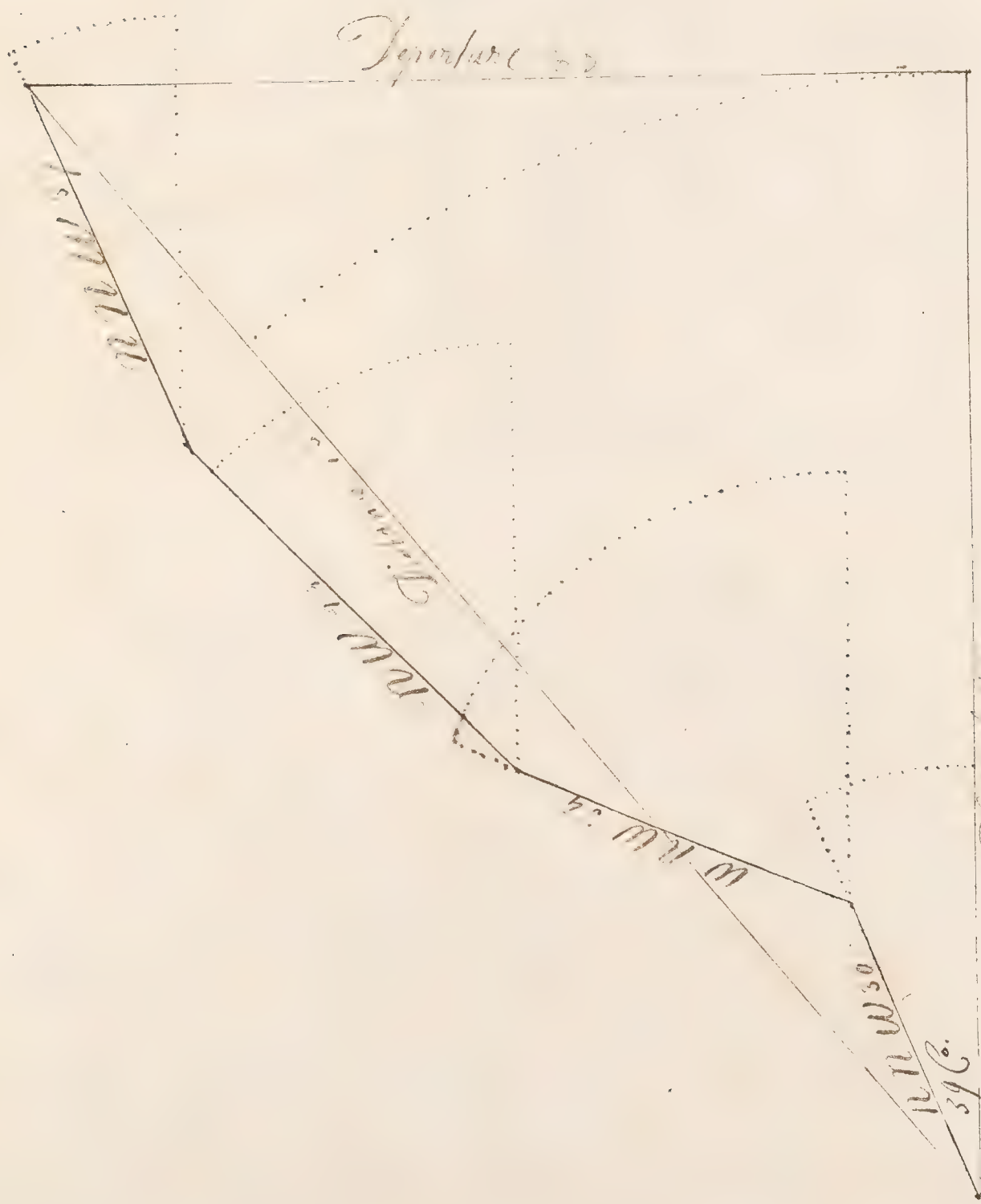
Course	Dist.	Point	No	S	E	W.
NNW	...	2	27.1	...	...	11.5
WNW	34	6	1.1.1	...	...	31.4
NW	44	4	31.1	...	...	1.1
NNW	37	2	34.2	...	...	14.2
			106.0	...	...	57.3

as y^e L^t Lat . . . . . 106 . . . 2.025306
is to y^e Rad . . . . . 7.00 . . 10.000000
so is y^e Departure . . . . . 88 . . . 1.944483
to y^e Tangent of y^e Course . . . 59 . . 9.991977

as Rad . . . . . 45.00 . . . . 10.000000
is to y^e Diff. of Lat . . . . . 106 . . . . 2.025306
so is y^e ~~Departure~~ Distance of y^e Course . 39.42 . . . . 10.113743
Distance . . . . . 178 . . . . 2.139049

(3) 1st Course

(Dist. 30 Miles from St. Clement on the Coast of Ireland.
Sails the Same Course Viz! N N W 30 Miles
at 8 P.M. Hauls to and Hills 3 Degrees
her Course Distance and Latitude Come into


Departure
N N W 30 M
N W by W 30 M
W N W 30 M
N W by W 30 M
N W 30 M
W by N

Preparation.

Cape Clear. Sat
Diff 31.10 No
1.33 So.
Come into 49.27

Course	Dist.	R.	No.	So.	E	W
ESE	24	6	...	9.2	22.2	...
SBW	24	1	...	23.5	...	4.7
SE	42	4	...	29.7	29.7	...
SSE	34	2	...	31.0	13.0	...
			...	93.4	64.9 4.7 60.2	4.7

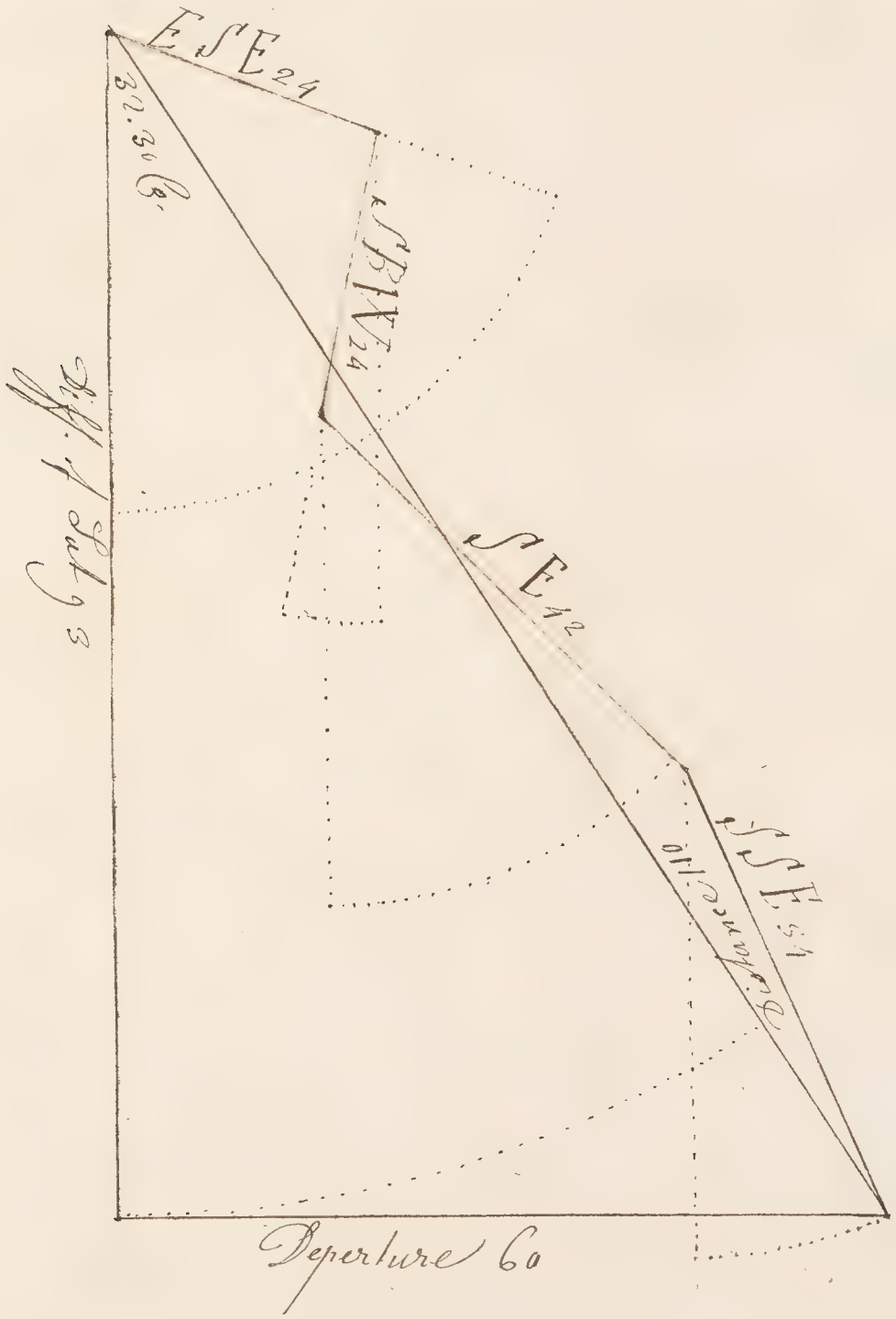
X. Sat. Sper.

as y^e X Sat . . . . . 98. . . 1.966483
is to y^e Rad. . . . . 45.00 . . 10.000000
so is y^e Departure . . . . . 60 . . 1.778151
to y^e Tangent of y^e Course . . . . 32.30 . . 9.809668

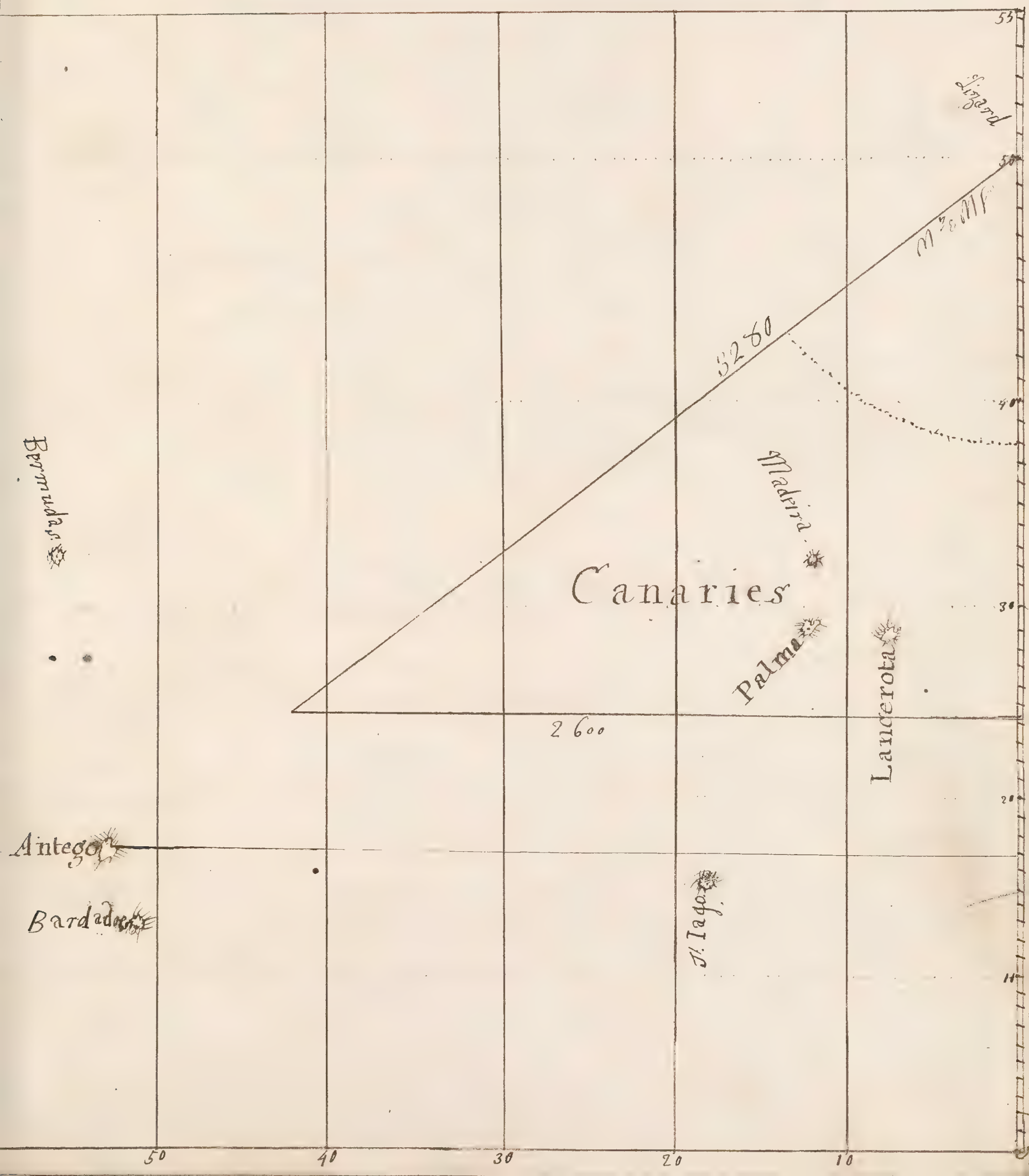
as Rad . . . . . 45.00 . . 10.000000
is to y^e X Sat . . . . . 98 . . 1.966483
so is y^e Secant of y^e Course . . . . 32.30 . . . 10.073971
to y^e Distance . . . . . 110 . . . 2.040454

A Traverse

Steering a Ship from Cape Clear on the Coast of Ireland Wards the following Courses viz E & S
24 Miles SSE ½ E & 42 Miles E ½ S — 3
Demand her Course, Distance and Lat. Come into



A C Mercators Chart



Separation

P Lat

50.00 No
17.00 No.
33.00
60
1980

M Lat

3475
1035
2440

Longitude

00.00
54.07 W Long.
60
3247

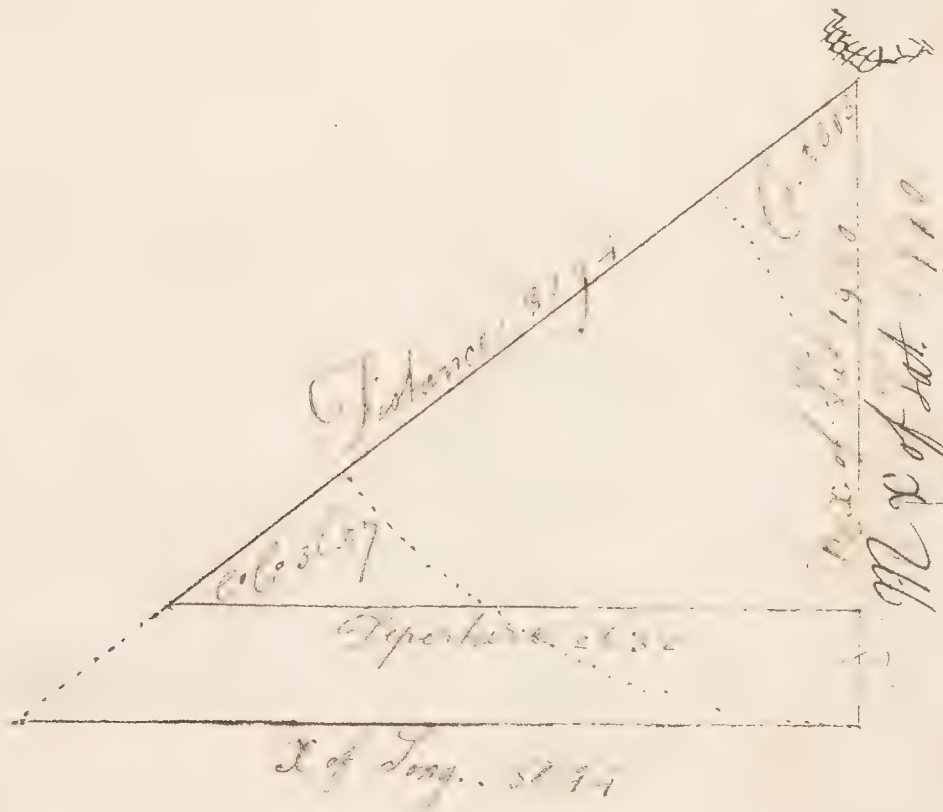
as M x Lat	2440	3.387390
so to y^e Rad.	45.00	10.000000
so is y^e X of Long.	3244	3.511081
to y^e Tangent of y^e Course	53.13	10.123691
as y^e Tangent & Co	36.57	9.876326
so is y^e P x of Lat	1980	3.296665
so is Rad	45.00	10.000000
to y^e Departure	2632	3.420339
as Rad	45.00	10.000000
so is y^e Departure	2632	3.420268
so as y^e Secant & Co	36.57	10.093363
to y^e Distance	3294	3.517631

Mercator's Sailing

Ex. 1.

Given the Latitude of the Departure, Longitudes
and the Course, Distance & Departure.

A Ship sails from Lat. 51° 7' N. Long. 3° 30' W.
and is bound to Antigua — I demand
her Distance, Departure and Course the nearest
Steer



Preparation

P Latitude
Cape Ortegal 44-04 No.
Come into 49.34 No.
5.30
60
330

M Lat
49 51
3434
.433

Longitude
1.48 W.
20.05 W.

as Rad. . . . . 45.00 . . . 10.000000
is to M x of Lat . . . . . 483 . . . 2.683947
so is y^e Tangent of y^e Course . . . . . 56.15 . . . 10.183342
to y^e X of Long . . . . . 787 . . . 2.867289

as Rad . . . . . 45.00 . . . 10.000000
is to y^e x of Lat . . . . . 330 . . . 2.518514
so is y^e Secant . . . . . 56.15 . . . 10.260937
to y^e Distance . . . . . 602 . . . 2.779501

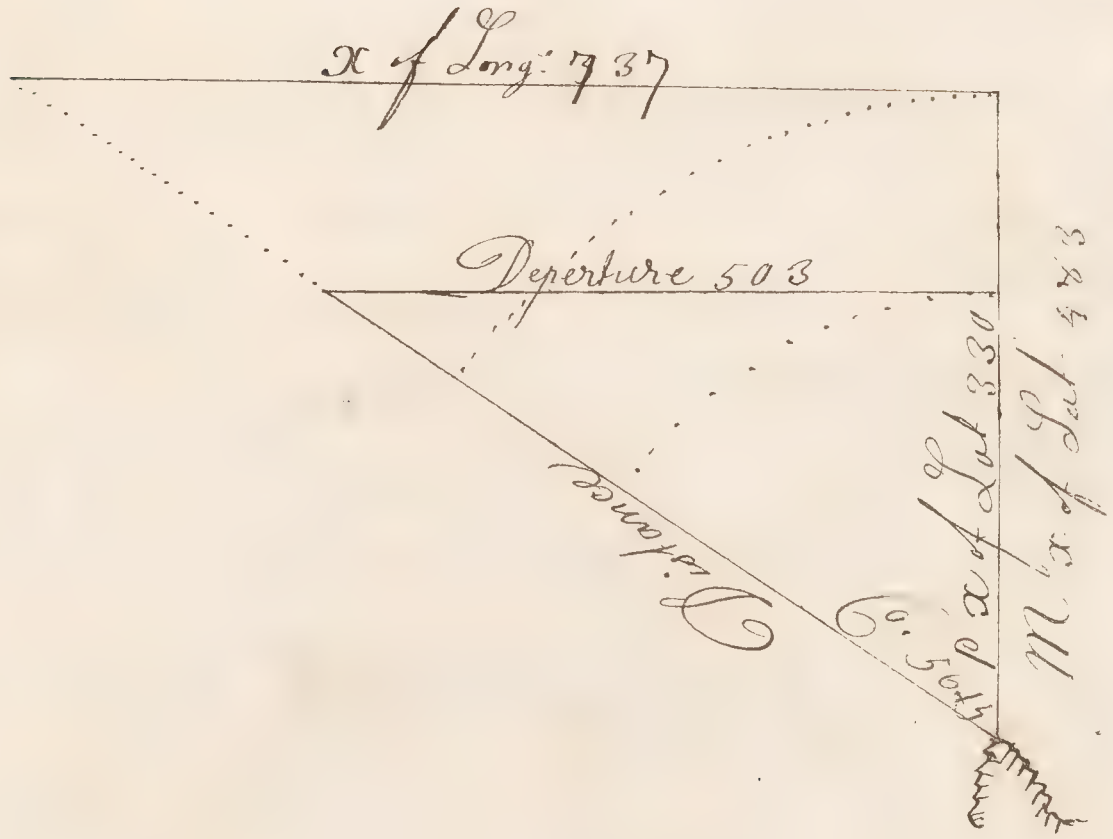
as Rad . . . . . 45.00 . . . 10.000000
is to y^e Px of Lat . . . . . 330 . . . 2.518514
so is y^e Tangent of y^e Course . . . 56.15 . . . 10.183342
to y^e Departure . . . . . 508 . . . 2.701856

Prob. 2nd

To find the Latitude and Longitude

To find the Distance & Dep. Made good.

Admiral Ship from Cape Ortegal W. 1/2 N. 1340
Miles She comes into the Lat. of 49° 3' N.
Required her Distance, Departure, and
Longitude Come into



P

	m Lat	Long
Come from 6700 No.	4774	17.17 W.
Come into 5800 No.	4294	8.13
	480	9.03

as P x of Lat	240	2.380211
is to y^e Rad	45.00	10.000000
so is y^e Distance	344	2.536558
to y^e Secant of y^e Co	45.44	10.156347

as Rad	45.00	10.000000
is to P x of Lat	240	2.380211
so is y^e Tangent of y^e Course	45.44	10.011624
to y^e Departure	247	2.391835

as Rad	45.00	10.000000
is to M x of Lat	480	2.681241
so is y^e Tangent of y^e Course	45.44	10.011624
to y^e Diff of Long	493	2.692865

Course 45.14 or SE

Case 3

Given Both Latitudes and Distance

to find the Course, Dep. and Diff. Long.

Admit a Ship from Thatch at 6 A.M. to N.

Long. 17° 14' W. Sails N.N.W. between 4 & 5 and the 6th which time by Observation She is found in Lat 5° 8' 00" N.

Required her Course, Departure and Long.

Come into

Preparation

p Latitude	M Lat	Long.
Come from 56.30 No.	4128	24.24 W
Come into 63.30 No.	4972	8.02
7.00	844	16.22 W
60		
420		

as p x of Lat	420	2.623249
so to y Rad	45.00	10.000000
so to y Departure	240	2.380211
to y Tangent of y Course	29.44	9.756962
as Rad	45.00	10.000000
so to y p x of Lat	420	2.623249
so to y Secant of y Course	29.44	10.061309
to y Distance	482	2.684558
as Rad	45.00	10.000000
so to M x of Lat	844	2.926342
so to y Tangent of y Course	29.44	9.756759
to y Diff of Long.	482	2.683101

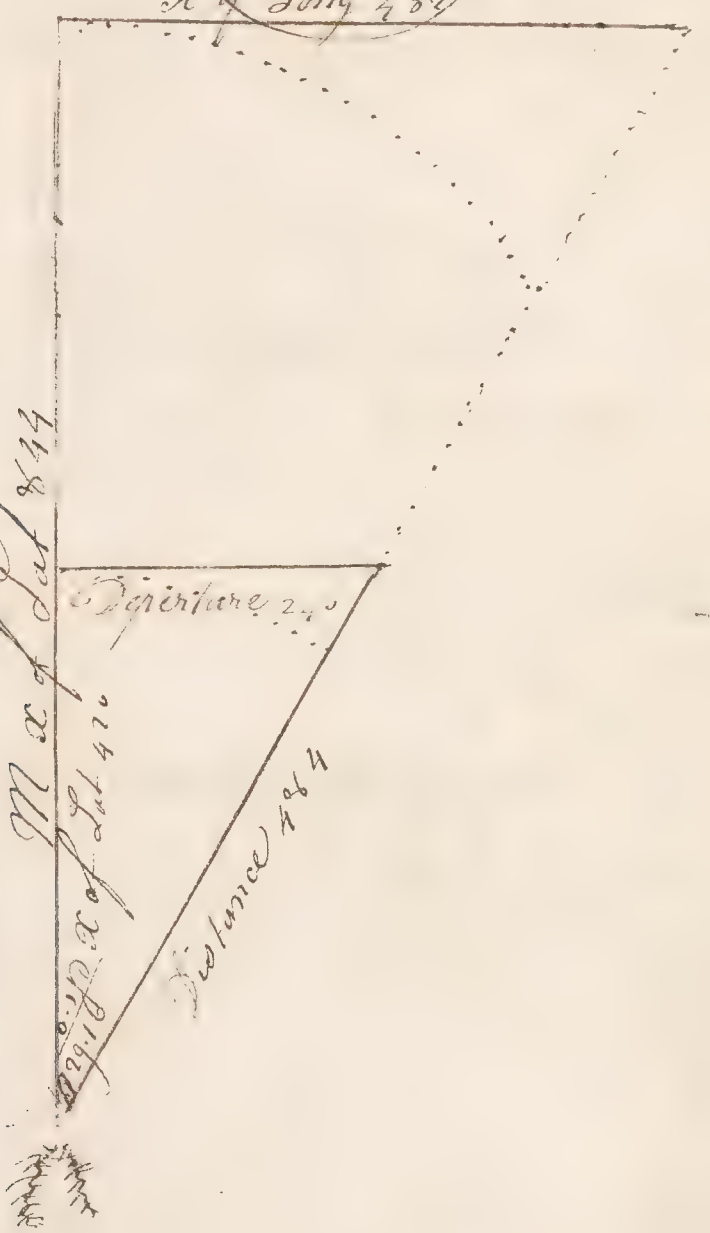
Course 29.16 W N 6½ E

Case 4

To find the Departure and true Latitude.

Or find the Course, Dist. and D. Long.

Admiz a Ship from 6. 30 N.° and Long. 2 h. 2 W. Sails between the N.° and E.ly Winds Depart. in 240 Miles, at which time by Observation She is found in 63. 30 N.° I Demand her Course, Distance and D. Long: Course



Preparation

6/a | 28/91
4.49

6/a | 31/1
5.14

	ℓ Lat	M Lat	Long
Cape Finisterre	43.10 N.	2877	10.00 W.
Diff	4.49 S.	2495	5.14 W.
Come into	38.21	382	15.14

as ye Secant of ye Course ..... 39.22 ..... 10.111763
so is ye Distance ..... 374 ..... 2.572672
so is ye Rad ..... 45.00 ..... 10.000000
to ye Px of Lat ..... 289 ..... 2.461109

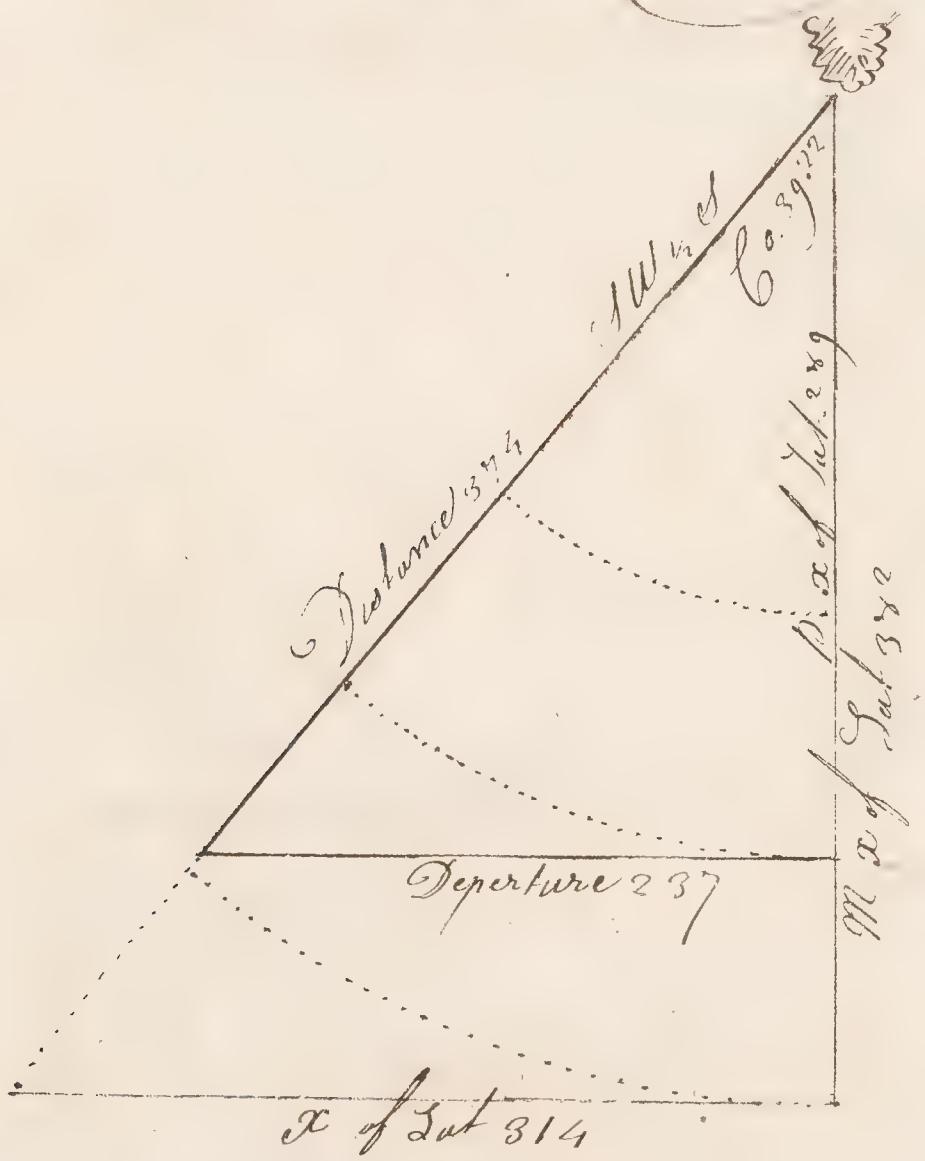
as Rad ..... 45.00 ..... 10.000000
is to Px of Lat ..... 289 ..... 2.460898
so is ye Tangent of ye Course ..... 39.22 ..... 9.914044
to ye Departure ..... 237 ..... 2.374932

as Rad ..... 45.00 ..... 10.000000
is to M x of Lat ..... 382 ..... 2.582063
so is ye Tangent of ye Course 3922 9914044
to ye x of Long ..... 314 ..... 2.496107

Ex. 75th

Given the Courses and Distances to find the Departures & Latitudes.

A Ship from the Meridian of Paris sails W.NW ½ W 93 Miles & Required her Departure, Latitude in and Longitude come to



Preparation

6 0 / 2 2 5
3.48

6 0 / 3 5 4
5.54

D Lat
Lat. 16.45 No.
Diff 3.48 So.
Com into 12.57

M Lat
1020
784
236

Long
22.35 W
5.54 W
28.29

as y^e Tangent of y^e Course ..... 56.15 ... 10.175107
is to y^e Departure ..... 842 ... 2.534026
so is Rad. ..... 45.00 ... 10.000000
to y^e D x of Lat ..... 228 ... 2.358919

as Rad. ..... 45.00 ... 10.000000
so is y^e D x of Lat. ..... 228 ... 2.357985
to y^e Secant of y^e Course ..... 56.15 ... 10.255261
is y^e Distance ..... 411 ... 2.613196

as Rad. ..... 45.00 ... 10.000000
so is M x of Lat. ..... 236 ... 2.372912
to y^e Tangent of y^e Course ..... 56.15 ... 10.175107
is y^e D x of Long^e ..... 354 ... 2.547019

Case 6th.

Given the Course and Departure
to find the Dist & { Latitude / Longitude }

Admit a Ship from the Island of St Jago
of the Cape de Verds Sails S W by W ½ W
Departure be 342 Miles — Required
the Distance Latitude and Longitude Come
in to

Trigonation.

P Lat	M Lat	Long
C Britain 46.10 N.	31.30	58.30
Diff. 50.01 No.	346	51.30
Come into 3.51	3476	7.00
60		60
231		420

---

as Rad	45.00	10.000000
so is y x of Long	420	2.623649
so is y Tangent of C	39.24	9.914560
to M. x of Lat	346	2.538209

---

as Radius	45.00	10.000000
so is y Px of Lat	231	2.363612
so is y Tangent of y Course	50.37	10.085698
is y Departure	241	2.449310

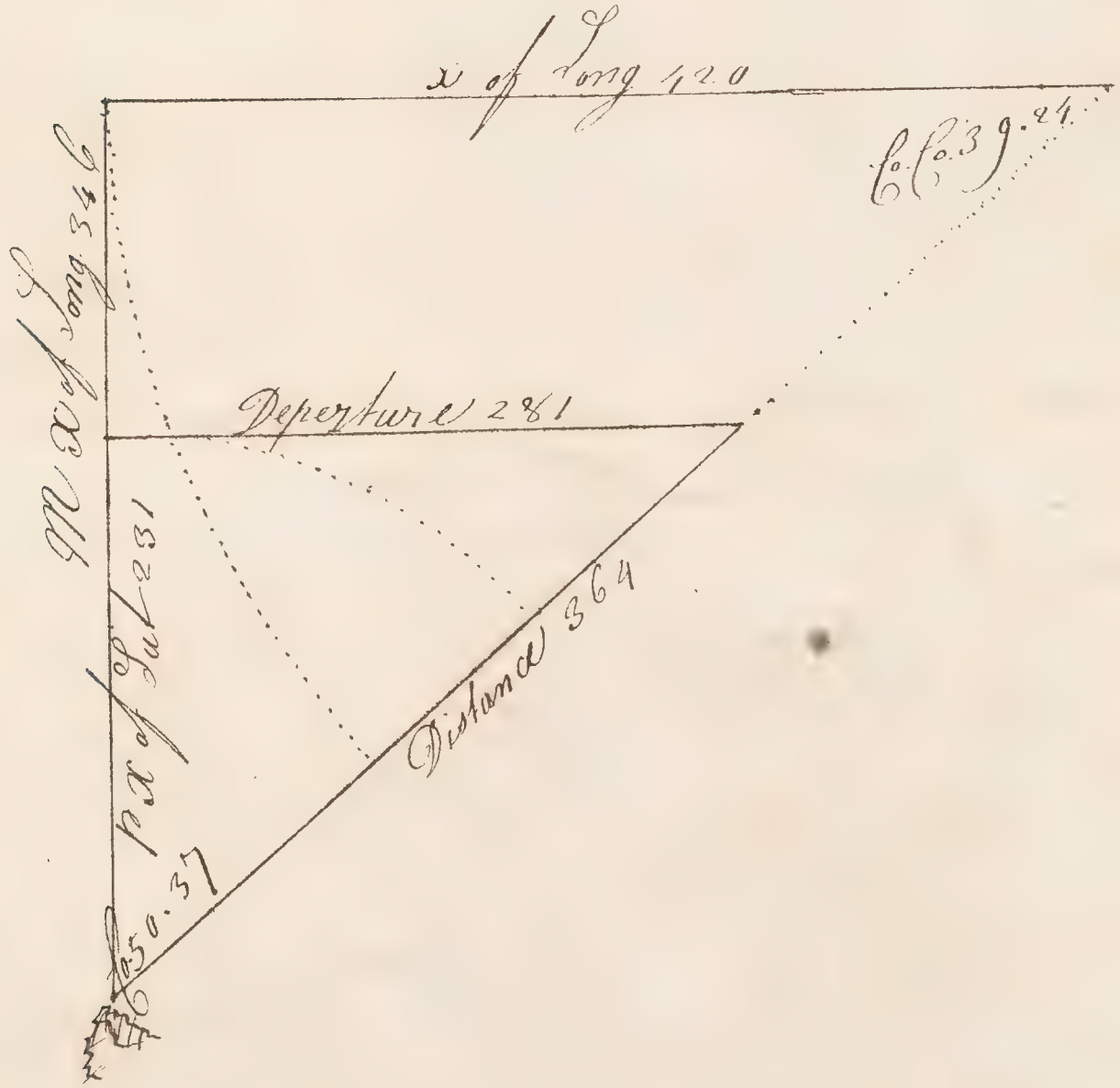
---

as Rad	45.00	10.000000
so is y Px of Lat	231	2.363612
so is y Secant of y Course	50.37	10.197565
is y Distance	364	2.561177

Lesson 7th

To find the Course and Difference of Latitude and Departure

Suppose a Ship from Cape Britain on the coast of new England Sails S.W. & by W. the Course unto the Latitude of 41° 30 Min. & Demand her Distance, Departure, and Lat. come into



Preparation

	D Lat	M. Lat
Hard point	50.7 No.	5485
Madeira	32.20 So.	2052
	17.47	1433
	10(67)	

Longitude

03.45 W.t
17.30 E.
13.45
60
825

Δ C J N

as m x of Lat	1433	3.156246
:: Radius	45.00	10.000000
:: x of Long	825	2.916454
: Tangent of y course	2956	9.760208
as Radius	45.00	10.000000
:: Px of Lat	1067	3.028164
:: Tangent of y course	2956	9.760272
to y Departure	614	2.788436
as Radius	45.00	10.000000
:: to y Px of Lat	1067	3.028164
:: Secant of y course	29.56	10.062178
to y Distance	1240	3.090342

Course	Dist.	Γ	N.	S	E	W.
WSW	204	6		74.1		188.5
NWbS	341	5		315.1		130.6
NWbW	198	5		109.0		164.5
				4715		5427

x Lat Departure

Preparation

	P Lat	M Lat
Hard P.	50.07 No.	3465
Diff	7.51	2.605
		.660
Remainder	42.17	

Long.
03.45 W
13.02 W
16.47 Course int.

6/0/47/1 — 7.51
6/0/7.8/2 — 13.2

Δ C D

as y x of Lat	471	2.673021
:: Rad.	45.00	10.000000
:: Departure	543	2.734810
: Tangent of Course	49.40	10.061779
as Radius	45.00	10.000000
:: x of Lat	471	2.673021
:: Secant of y course	49.00	10.184057
to y Distance	719	2.856078
as Rad.	45.00	10.000000
: Mx of Lat	680	2.832510
:: Tangent y course	49.00	10.060337
: x of Long	742	2.893346

Δ A C E

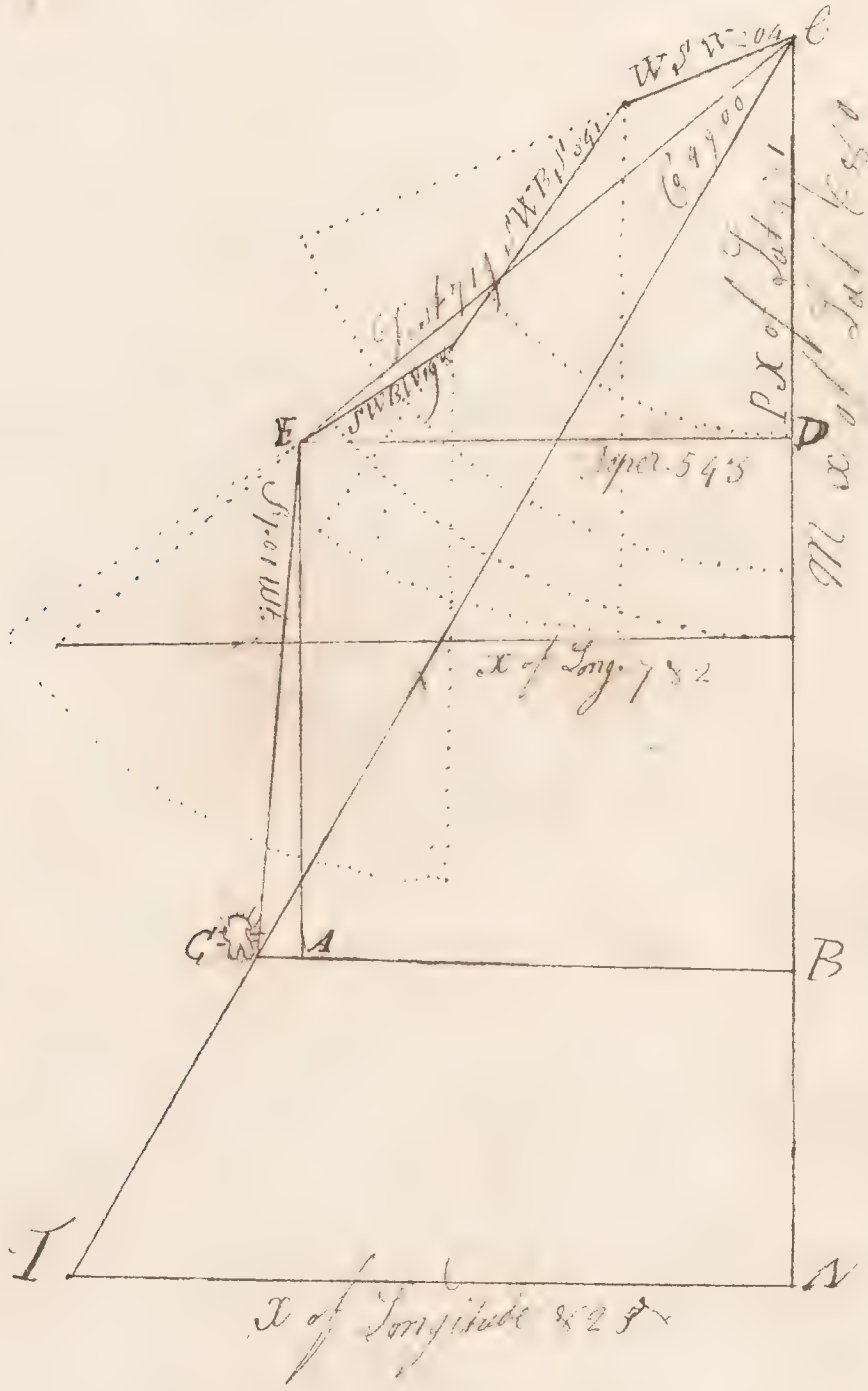
as x Lat	596	2.77552
:: Rad.	45.00	10.000000
:: Departure	71	1.85512
: Tangent y course	7.01	9.07660
as Rad.	45.00	10.000000
:: x of Lat	596	2.77552
:: y Secant y course	7.01	10.06632
to y Distance	600	2.77784

Mercator's Traverse

Admiral Ship takes her Departure from the Start Point, and is bound to Madeira, & lies the following Courses (viz)
West 20 Miles? West 13 & West 19 & Demand Rush, her Course Distance and Departure from the Start to the Island, Secondly her Course, Diff. Latitude and Longitude come into the Side of her Traverse Thirdly the Course and Distance from the Ship to her Port

C B 106
C D 47 1
D B = 64-59 6

B G 61 4
D E 54 3
A G 7 1



Preparation

Lat.

Cape St. Vincents 36.53 No.
St. Maries 36.59 No.

90.00
36.56
5304

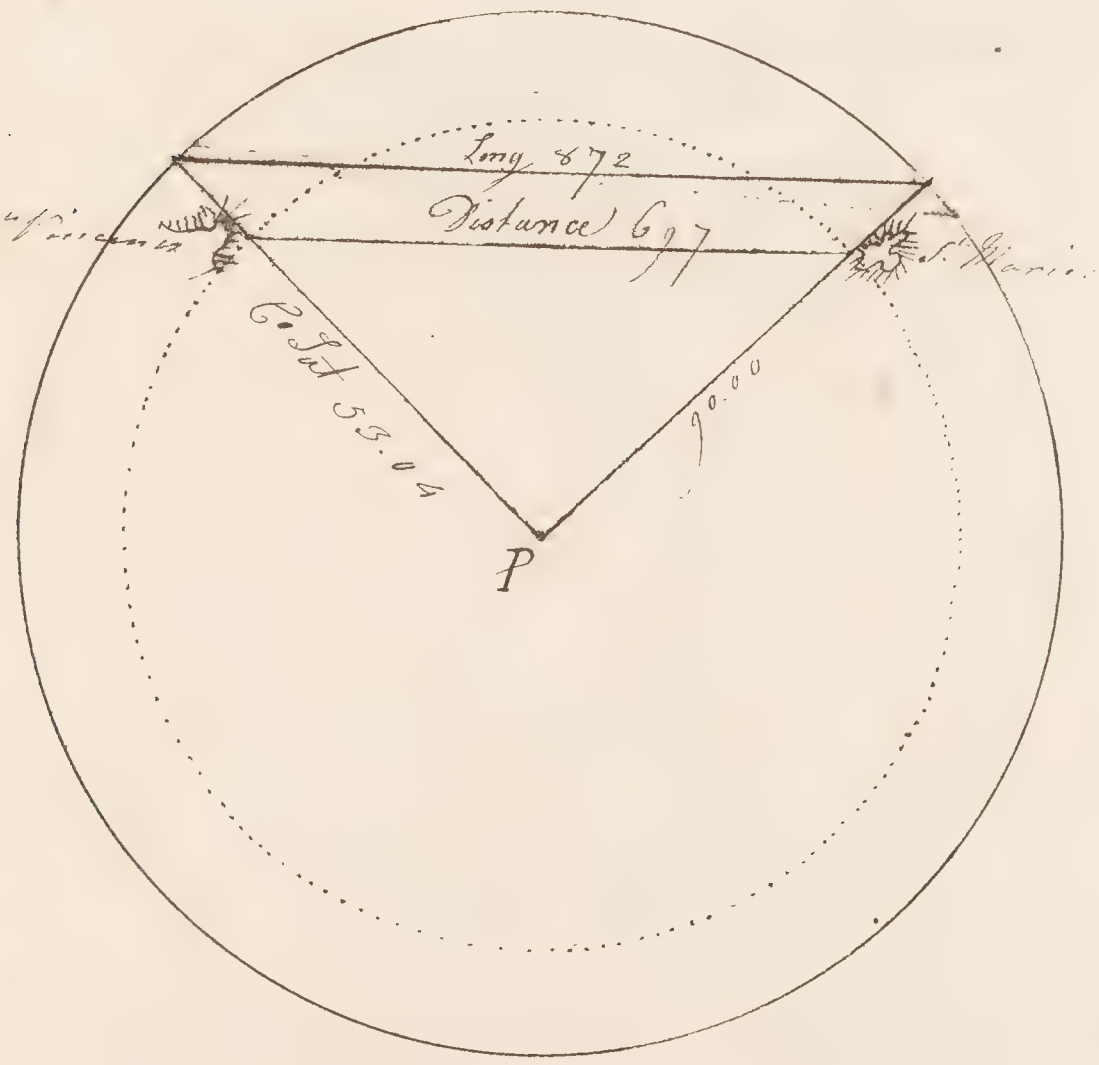
Long.

09.06 W.t
23.38 W.t
14.32
60
872

as Rad.	90.00	10.000000
as to y^e x. of Long	872	2.940516
as to y^e Co. Lat	53.04	9.902729
to y^e Distance	697	2.843245

Parallel Sailing

Admit a Ship from Cape St. Vincents from the Coast of Portugal is bound to the Island of St. Maries one of the Western Islands / Required her Distance



Preparation

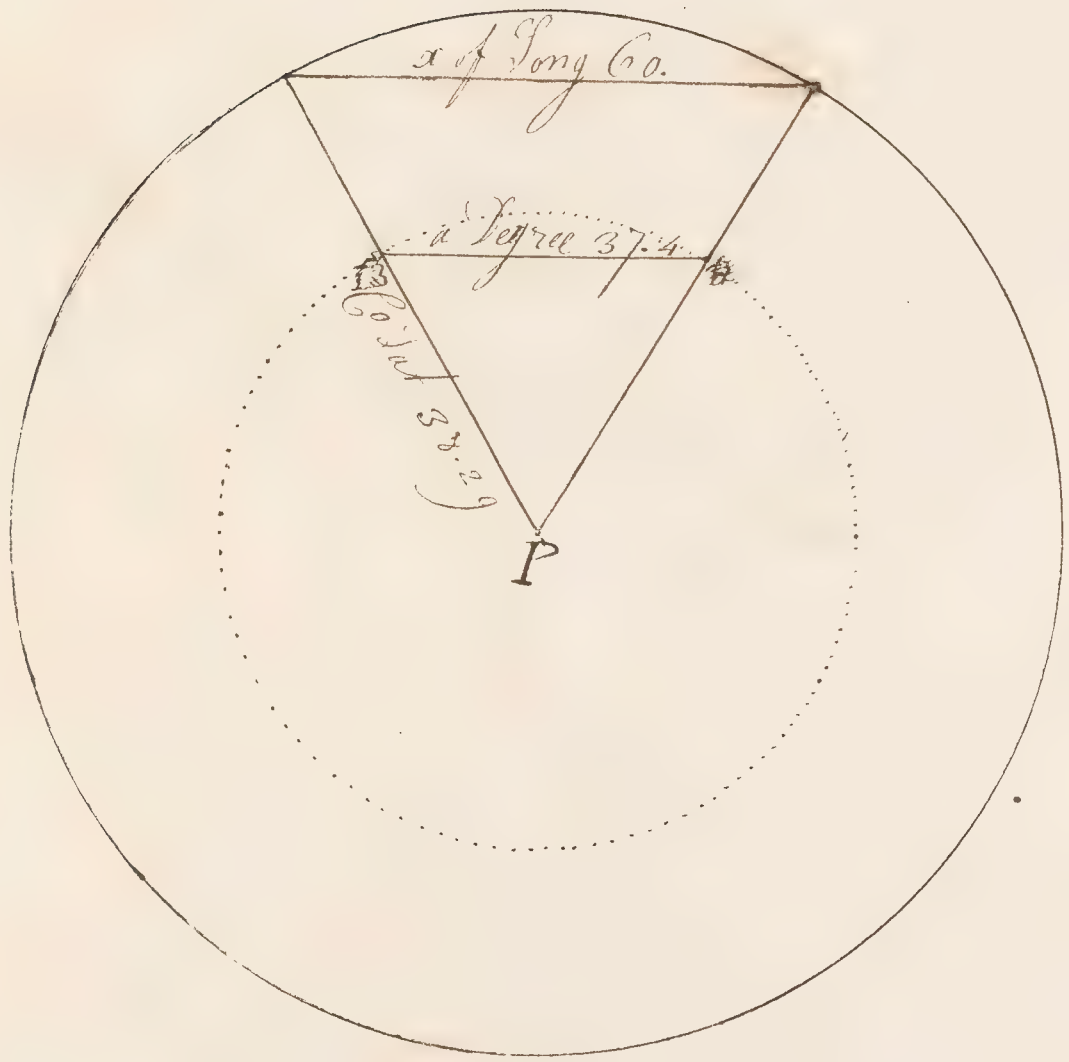
London $\frac{\circ\ '}{51.31}$

$\frac{90.00}{51.31}$
38.29

as Radius	90.00	10.000000
is to y^{e} Co Sat	38.29	9.793991
so is y^{e} x of Long	60	1.778151
to a Degree on y^{e} Parrellell	37.4	1.572142

Cassini 2nd

How many Miles makes a Degree of Longitude in the Latitude of London



as x of Long	504	2.702430
is to y° Distance	278	2.444045
so is Radius	90.00	10.000000
to y° Co Sat.	33.29	9.741615

Sat. some inta $\frac{90.00}{16.31}$

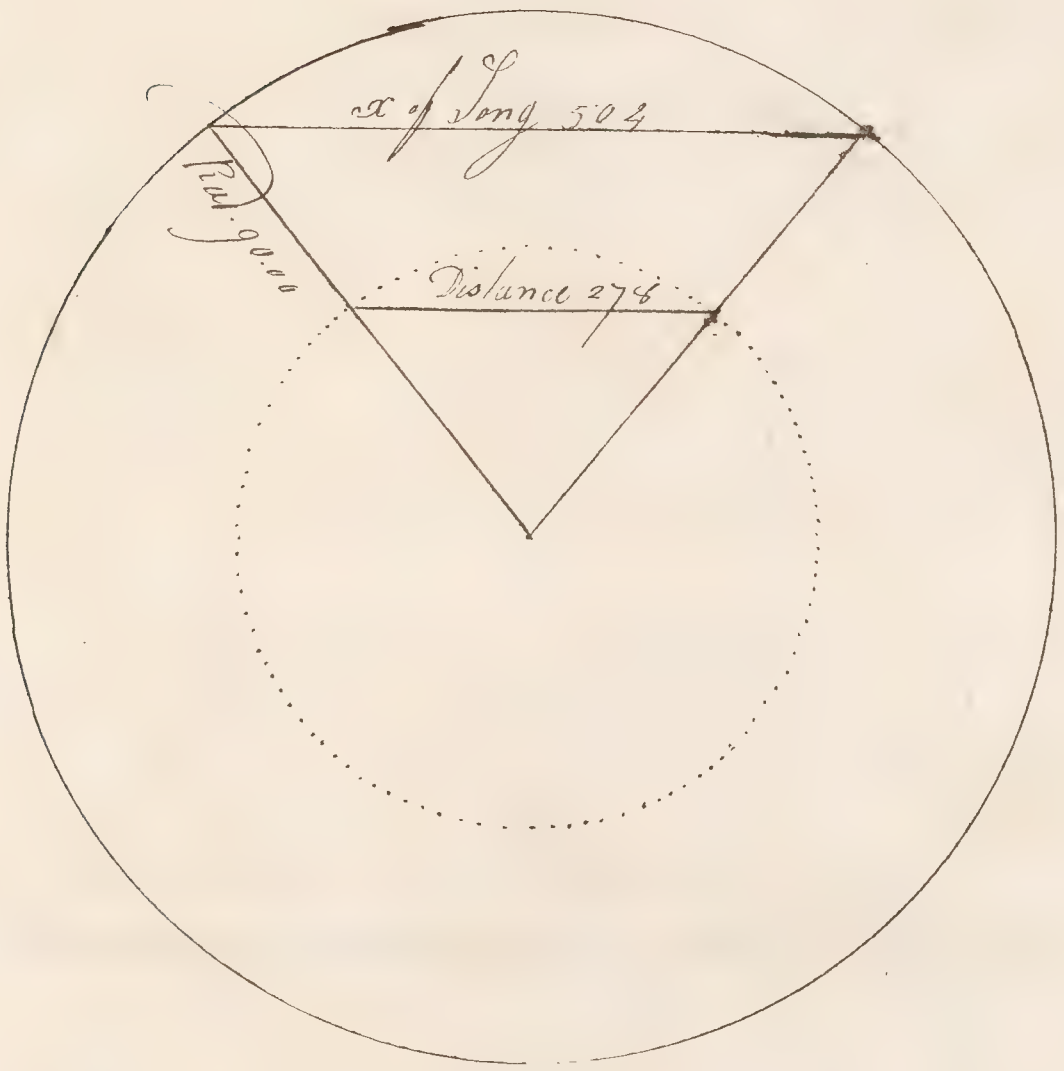
Att B.

Admiralty Office in the Parade 10 oo Aug.

Distant 60 Miles they both Sail N.W. a little

they one Each 278 Miles asunder — I demand

the Latitude they are Come into



Preparation.

Lat.	Mid. Lat.	Long
Lizard 50.00 No	50.00	00.00 W^t
Antegod 17.00 No	17.00	54.07 W^t
33.00	June. 67.00	54.07
60	Mid. Lat. 33.30	60
1980	Co. Mid. Lat. 56.30	3247

as y^e Secant fo Mid Lat.	56.30	10.258111
is to y^e x of Long	3247	3.511482
so is y^e Tangent fo Mid Lat.	56.30	10.179217
to y^e Departure	2707	3.432548
as y^e x of Lat.	1980	3.296665
is to y^e Radius	45.00	10.000000
so is y^e Departure	2707	3.432488
to y^e Tangent of y^e Course	53.47	10.035323

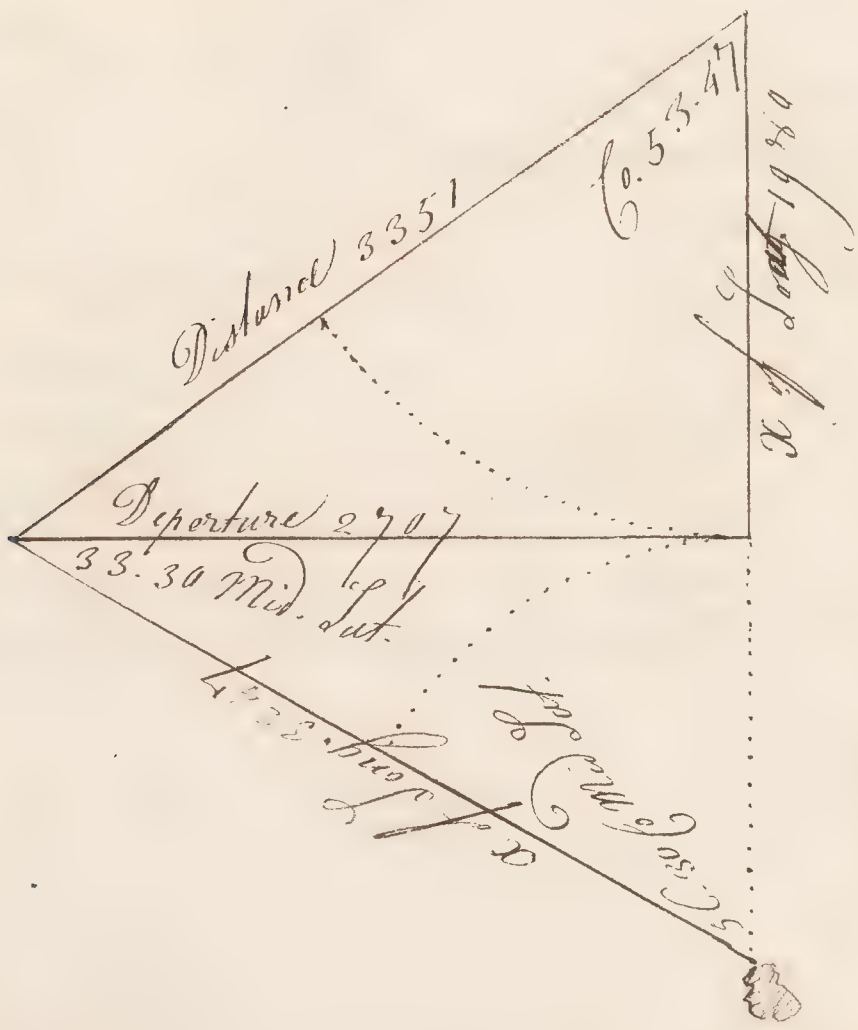
as Radius	45.00	10.000000
is to y^e x of Lat.	1980	3.296665
so is y^e Secant of y^e Course	53.47	10.224530
to y^e Distance	8351	3.521195

Middle Lat. Sailing

Case 1st

Given both Latitudes and Longitudes
To find the Course, Dist, and Departure.

Admit a Ship takes her departure from the Lizard and is bound to Antigoa — Demand her Course, Distance and Departure



Preparation

	Lat.	Lat.	Long
Cape Orlogal	44.04 No.	44.04 No	7.48 W^t
some into	19.34 No.	19.34 No	12.02 W^t
	5.30	Sume 63.38	some into 19.50
	60	Mid Lat. 46.49	
	330	to Mid Lat. 43.11	

as Radius	45.00	10.000000
is to y^e x of Lat.	330	2.518514
so is y^e Tangent of y^e Course	56.15	10.175107
to y^e Departure	494	2.693621

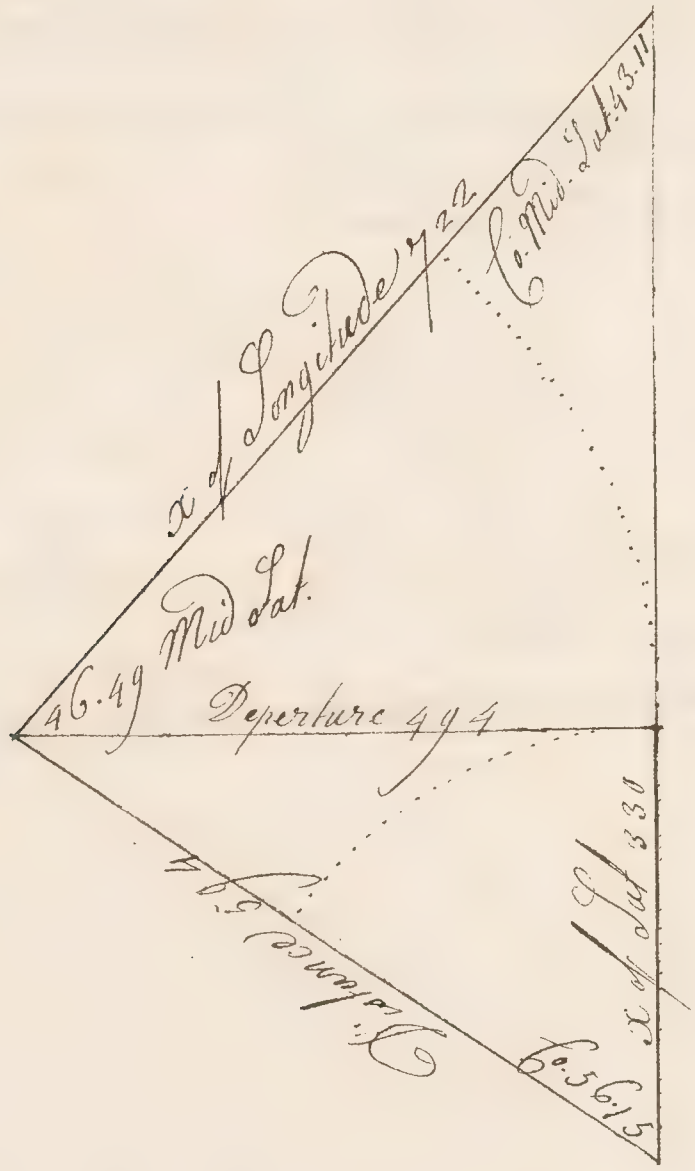
as Radius	45.00	10.000000
is to y^e x of Lat.	330	2.518514
so is the Secant of y^e Course	56.15	10.255261
to y^e Distance	594	2.773775

as Radius	45.00	10.000000
is to y^e Departure	494	2.693727
so is y^e Secant Mid. Lat.	46.49	10.164731
to y^e x of Long.	722	2.858458

Cast 2nd

Given back Latitudes and Course
and the Dist. of the Log.

Admiralty Office Orkneys Veers NW by W
Tide by Observation She is found in Lat 49. 31 N°
Departure Distance, Depart. and Long.
come into



Preparation

6°/49.4
8.14

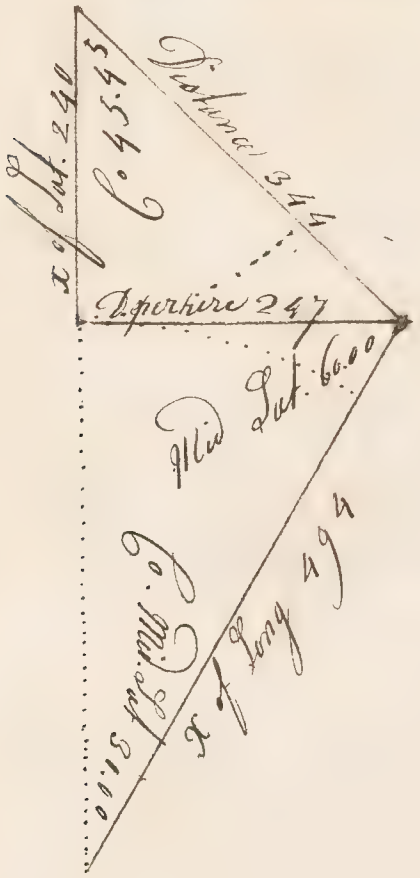
	Lat.	Lat.	Long
Come from	62.00 No.	62.00 No.	17.17 W.
Come into	58.00 No.	58.00 No.	8.14
	4.00	Sum 120.00	Come into 09.03
	60	Mid. Lat. 60.00	
	240	Co Mid. Lat. 30.00	

As Rad.	45.00	10.000000
is to y° Distance	344	2.536558
so is y° Secant of y° Course	45.45	10.156347
As Rad.	45.00	10.000000
is to y° Lat.	240	2.380211
so is y° Tangent of y° Course	45.45	10.011371
to y° Departure	247	2.391582
As y° Tangent Co. Mid. Lat.	30.00	9.761439
is to y° Departure	247	2.392697
so is y° Secant Co. Mid. Lat.	30.00	10.062469
to y° Longitude	494	2.693727

Case 3.

Given both Latitudes and Distance
To find the Course, Departure & Long.

Admiralty Ship from the Lat of 62.00 N.° &
Long. 17.17 W. Sails S by W. 86 Miles Between the
South and East, at which time by Observation
she is found in Lat 57.8.00 N.° and Demand
her Course, Departure, and Long. Come into



Preparation

6/0/7 2/7
12.7

Come from 11.11 No. 11.11 So. Sat. 24.24 W^t
Come into 02.02 No 02.02 No. 12.07 W^t
13.13 Sum 13.13 36.31
60 Mid. Lat. 6.36
793 Co Mid. Lat. 83.24

as x of Lat.		793	2.899273
is to y^e Rad.		45.00	10.000000
so is y^e Departure		722	2.858537
to y^e Tangent of y^e Course		42.19	9.959264

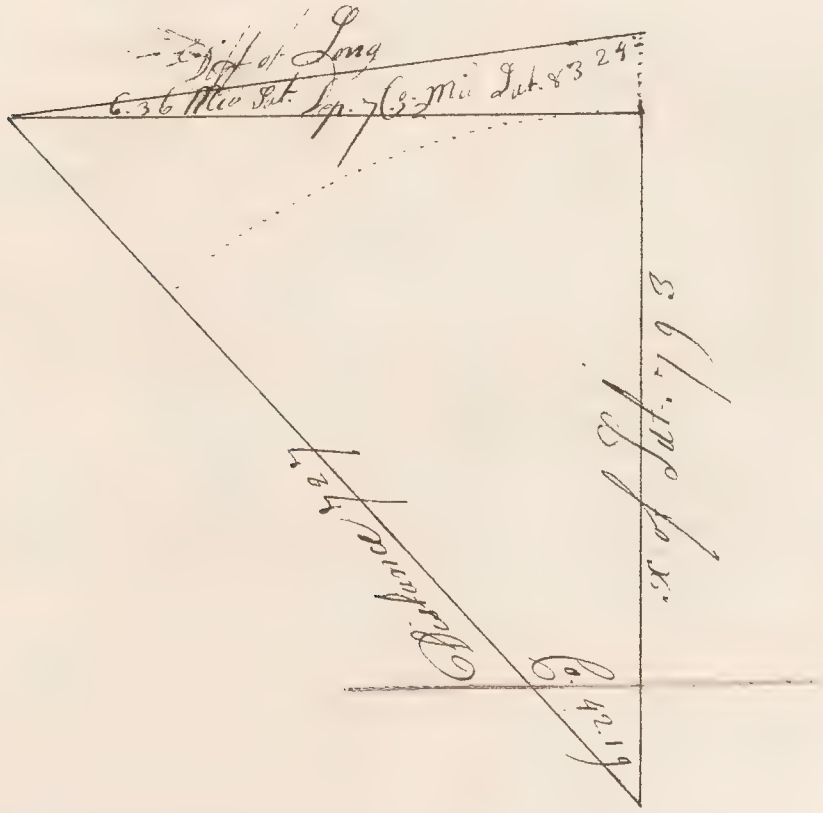
as Radius		45.00	10.000000
is to y^e x of Lat.		793	2.899273
so is y^e Secant of Course		42.19	10.131106
to y^e Distance		1073	3.030373

as Rad.		45.00	10.000000
is to y^e Departure		722	2.858537
so is y^e Secant of Mid Lat.		6.36	10.002888
to y^e ~~Distance~~ x of Long.		727	2.861425

Case 4.

Given Both Latitudes and Departure
to find the Course, Dist. & Diff. Long.

Admit a Ship from the Lat. of 11° 11′ S. and 24° 24′ W
Sails between N.E. & N. and W. till her Departure
be 722 Miles at which time by Observation She
is found in Lat 02° 02′ N. I Demand her
Course, Distance, and Diff. Long. required



6|0|2.8|9
4.49
11.10
38.21 Same into

Preparation

6|0|31|3
5.13

		Sat.	Sony
Cape Finister	43.10 No.	43.10 No	16.00 W
Same into	38.21 So.	38.21 So.	15.13 W
		Sum 81.31	
		Mid. Sat. 40.45	
		Co Mid. Sat. 49.15	

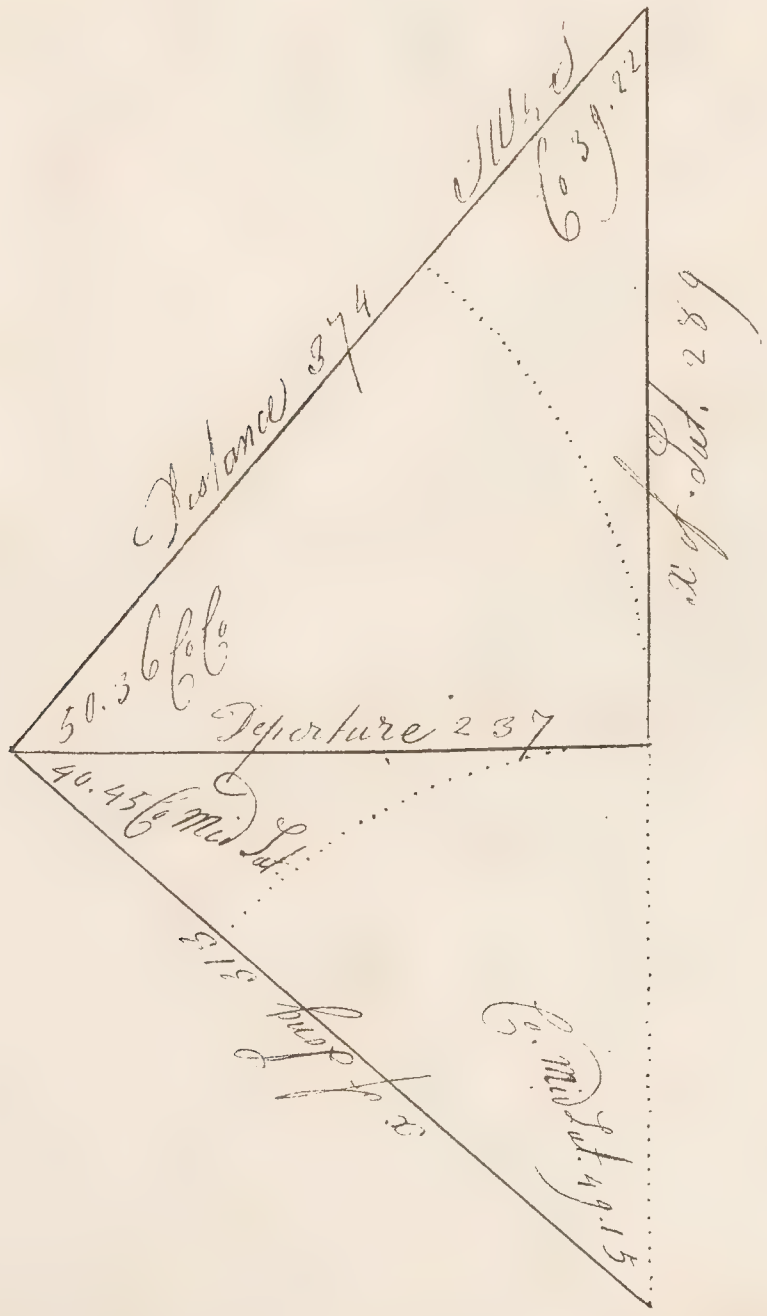
as y° Secant of Course	50.36	10.197411
is to y° Distance	374	2.572872
so is Rad.	45.00	10.000000
to y° Departure	237	2.375481
as Rad.	45.00	10.000000
is to y° Departure	237	2.374748
so is y° Tangent of Co	50.36	10.075440
to y° x of Sat.	289	2.460188

as y° Tangent Co. Mid. Sat.	49.15	10.064667
is to y° Departure	237	2.374748
so is y° Secant Co Mid Sat	49.15	10.185247
to y° x of Sony	313	2.495073

Case 5th

Given the course and Distance
to find the Departure } Latitude
Longitude

Admit a Ship from a Port in Latitude
Mid Lat Middle Diamond bar
Departure Latitude and Longitude



6 | 0 | 22 | 8
3.48
16.45
13.57

6 | 0 | 35 | 9
5.54

Preparation

Lat.	Lat.	Long
Sal 16.45 No	16.45 No	22.35 W
Come into 13.57 So.	13.57 So.	5.54 W
	Sum 30.42	27.29
	Mid. Lat. 15.21	
	Co. Mid Lat. 74.39	

as Rad	45.00	10.000000
is to y° Departure	342	2.534026
so is y° Tangent of y° Co.	33.45	9.824093
to y° x of Lat.	292	2.358119

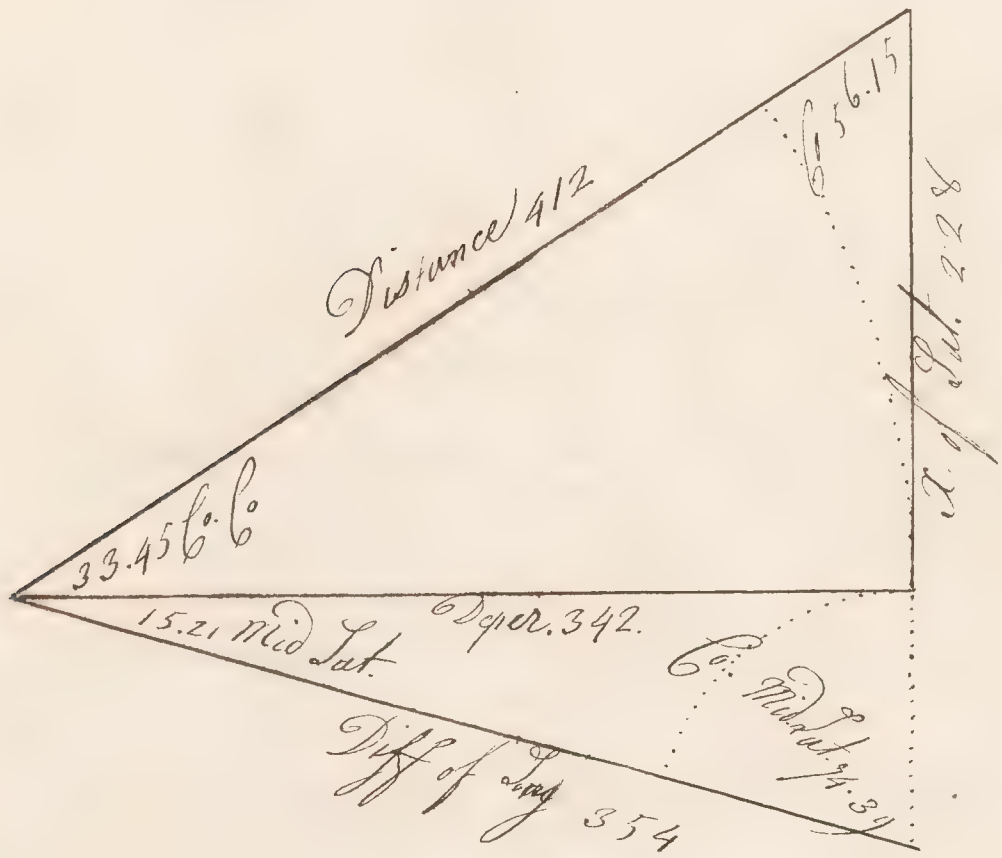
as Rad	45.00	10.000000
is to y° Departure	342	2.534026
so is y° Secant. Co. Co.	33.45	10.080154
to y° Distance	412	2.614180

as y° Tangent Co Mid Lat.	7439	10.561446
is to y° Departure	342	2.534026
so is y° Secant Co Mid Lat.	74.39	10.577222
to y° x of Long.	354	2.549802

Cast 6th

Given the Course and Departure to find the Distance and Lat & Long

Admit a Ship from the Island of Salt and of the Cape de Verds Bears S W by W distant 342 Miles — Required their distance Latitude and Longitude Sailed into



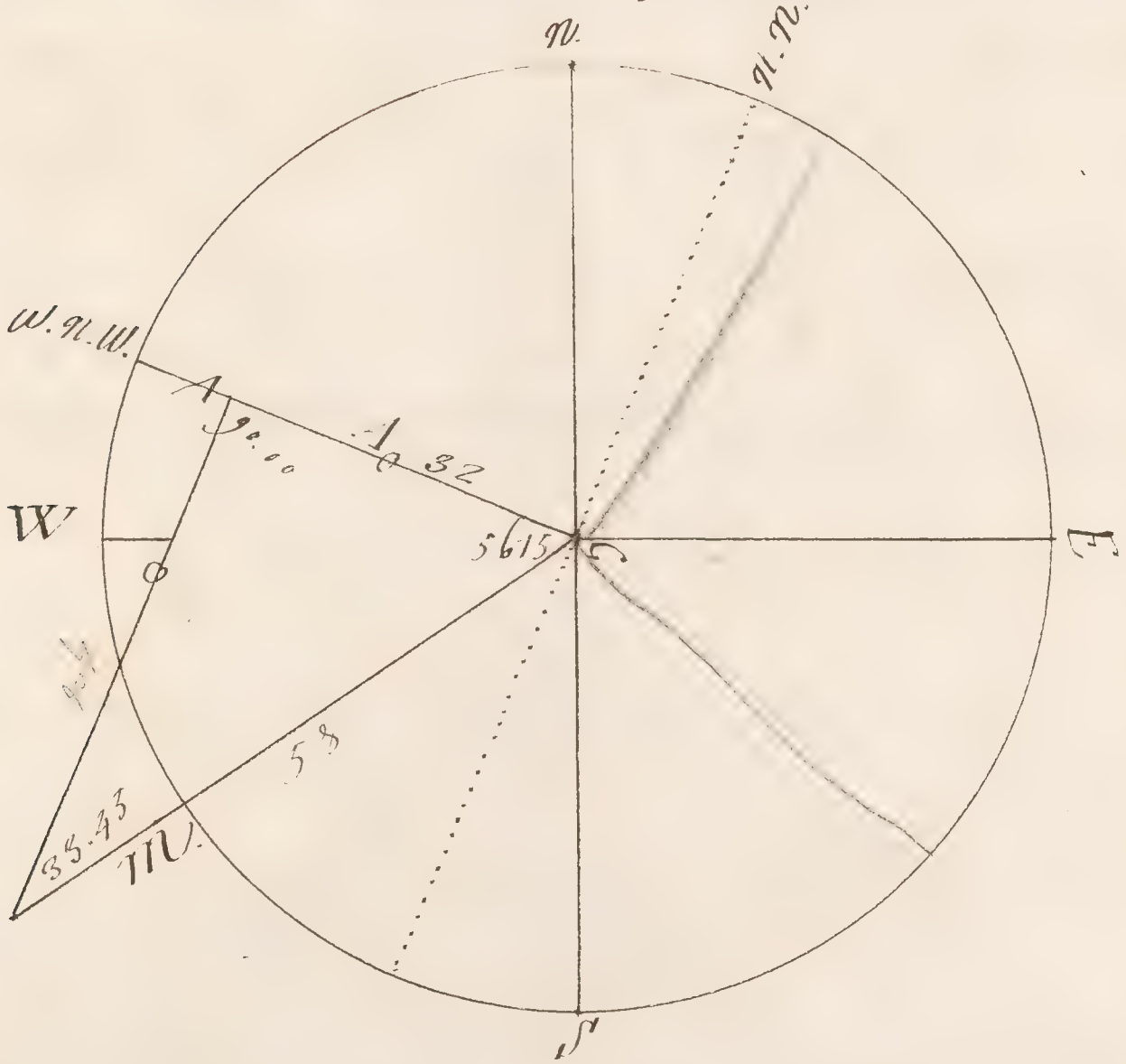
The arc in Proportion to the
Lines of Right Ascension and Declination;

as A Sine	90.00		10.000000
is to M E	58		1.763427
so is ye Sine E	56.15		9.919846
to A M	48		1.683274

as ye Sine A	90.00		10.000000
is to M E	58		1.763428
so is ye Sine M	33.45		9.744739
to M A	32		1.508167

Oblique Sailing

Admits a Ship Sailing in y^e^ English Channel
and Sets out from ~~Hadlow~~ by the Compass and finds it
to bear W. by N. the Course S.W. by W. 8
Miles and then the aforesaid Headland bears
from Her N.N.E. Distance and the Headland
Distance in her first and last Situation



as B C ..... 1002 ..... 3.000868

is to Sine A ..... 67.30 ..... 9.965615

so is B A ..... 752 ..... 2.876217

is to Sine C ..... 44.00 ..... 9.841833

as Sine A ..... 67.30 ..... 9.965615

is to B C ..... 1002 ..... 3.000868

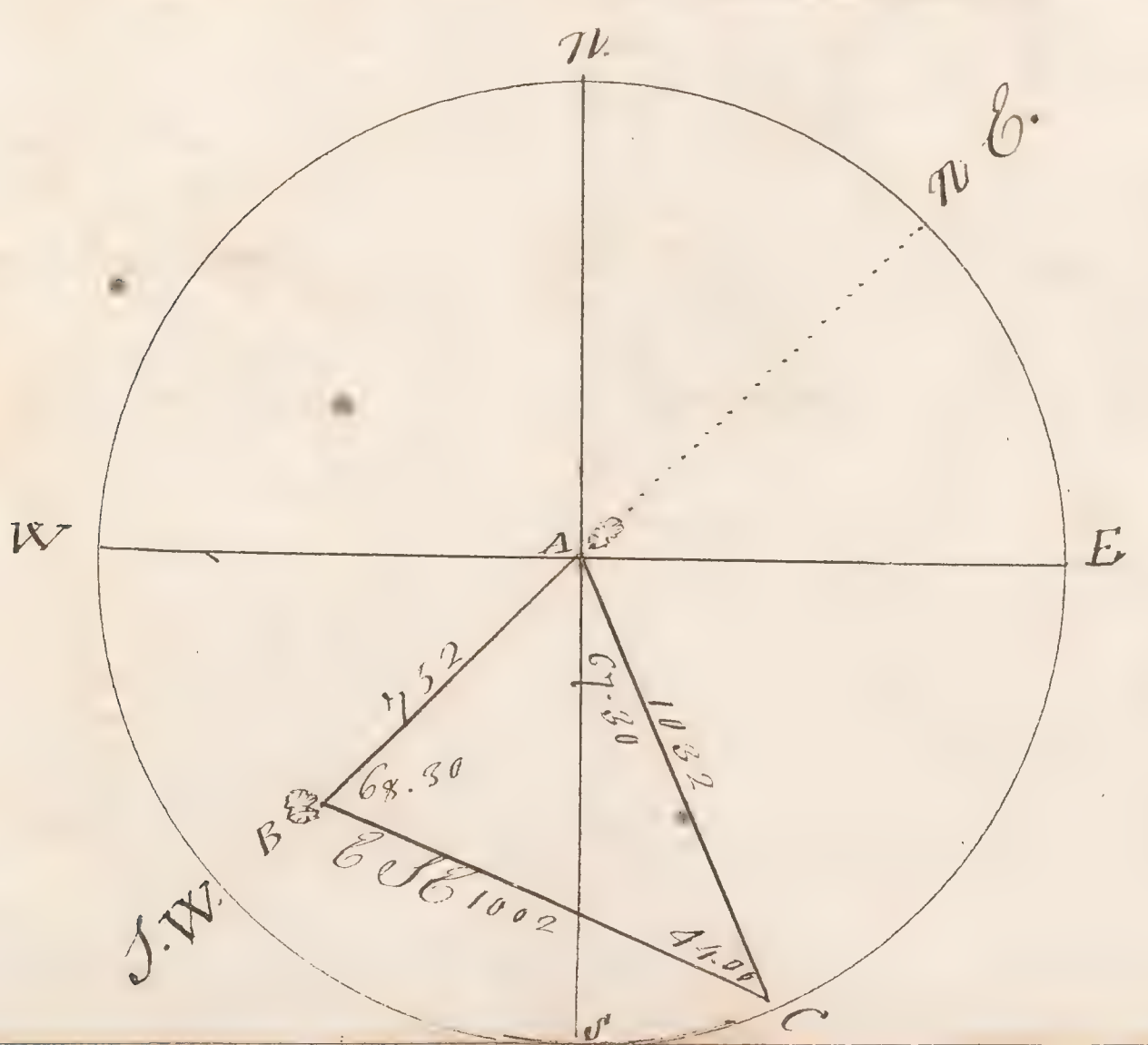
so is Sine C ..... 68.30 ..... 9.967867

to A C ..... 1032 ..... 3.013931

Ex 2nd

Given two Sides and an Angle Opposite to find the Rest

Admit two Ports bearing from each other N E and S W. Distant 752 Miles a Ship at the Northermost Sails N.E. and another at the Southermost Sails thence 1002 and then Meets with the first Ship — I Demand the first Ships Distance and the Second Ships Course —



Rule

As the Sum of the two Sides including ∠ C
is to their Difference
So is the Tang. of ½ the Opposite ∠s
to the Tang. of ½ their Difference.
Which ½ Diff. added to the ½ Sum gives
the greater Angle, and subtracted leaves the
Lesser

Preparation

Sides	AB	542	∠A	56.15
	CA	657	34	180.00
Sum Sides		1199	2 ∠s	123.45
Diff		115	½ 2 ∠s	61.52

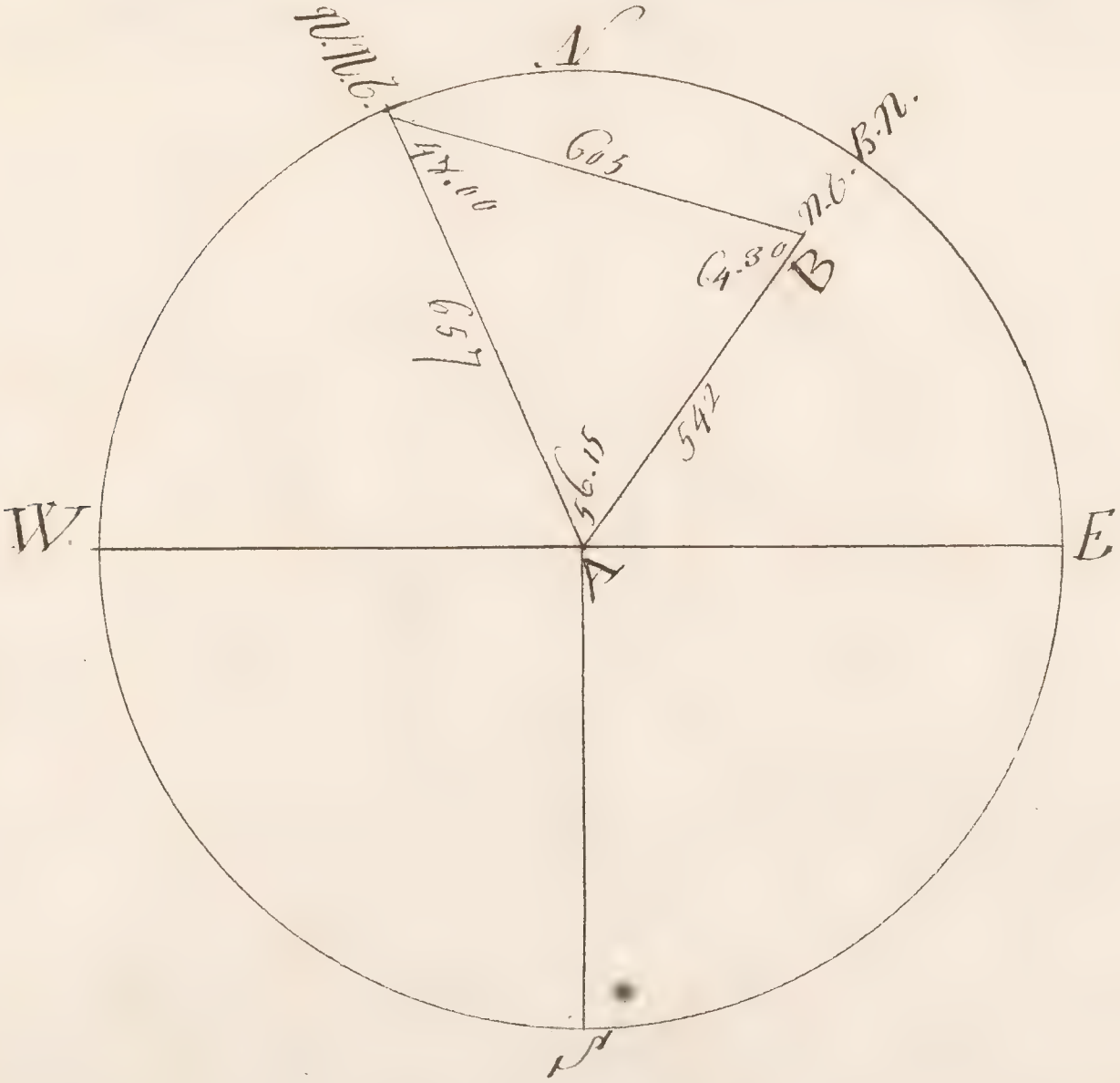
as y^e Sum Sides	1199	3.078819
is to y^e Tangent ½ Sum ∠	36.15	19.179247
So is y^e x of y^e Sides	115	2.060698
to y^e Tangent ½ x	8.15	9.161096
∠B	64.30	
∠C	48.00	

as y^e Sine ∠B	64.30	9.954488
is to BA	657	2.817565
So is y^e Sine ∠A	56.15	9.919846
to CB	605	2.781926

Ex. 35

Given two Sides and an Angle included
to find the Rest —

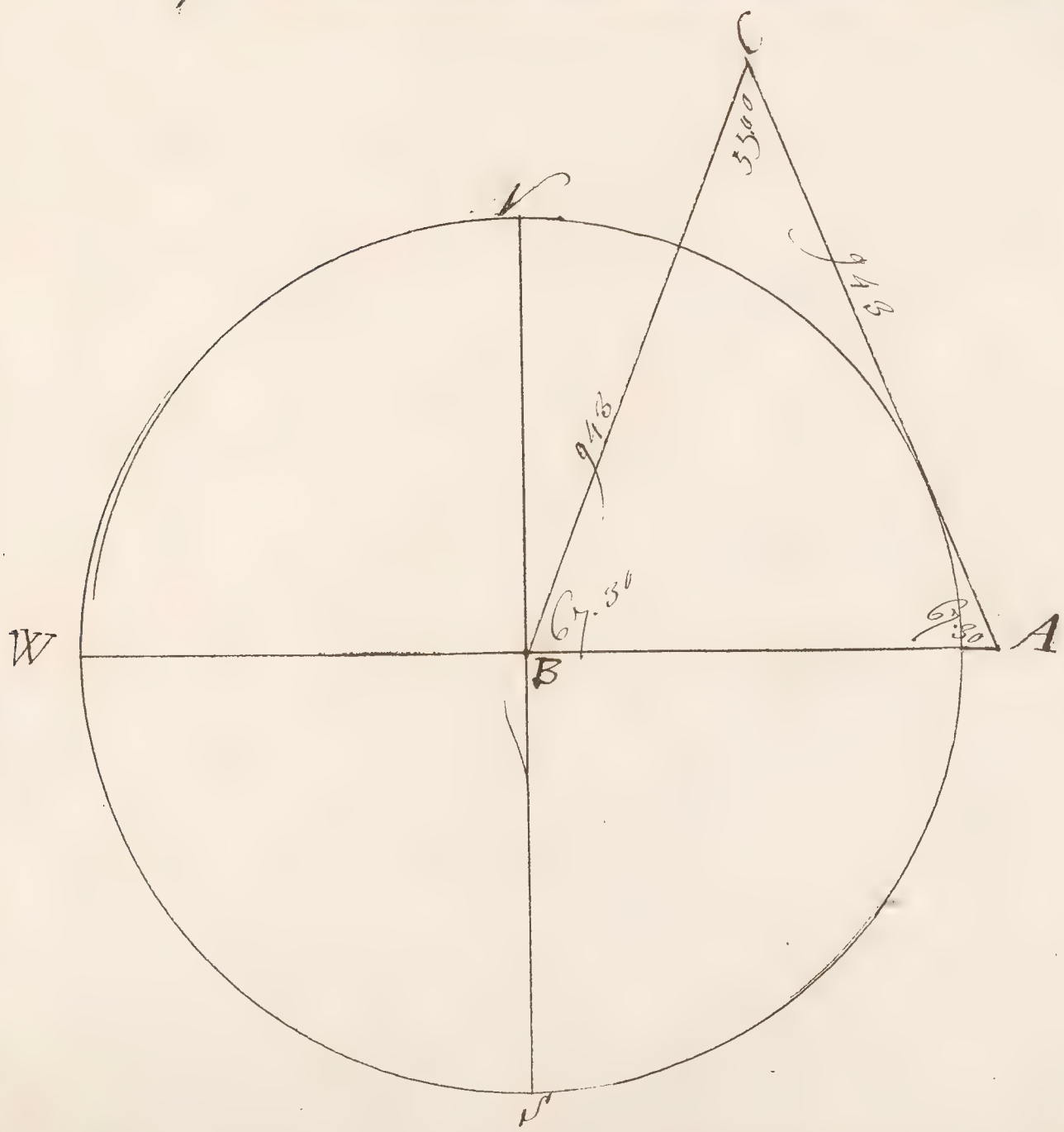
Admit two Ships sail from a certain Port,
the first, N. E. by N. 5½ Miles, the Second
N. W. by W. 6½ Miles — I Demand their
bearings and Distance from each other



as Sine ∠ C	45.00	9.849485
is to B A	422	2.858537
so is the Sine ∠ A	67. 30	9.965615
to the Side B C	943	2.974667

Turning to Windward

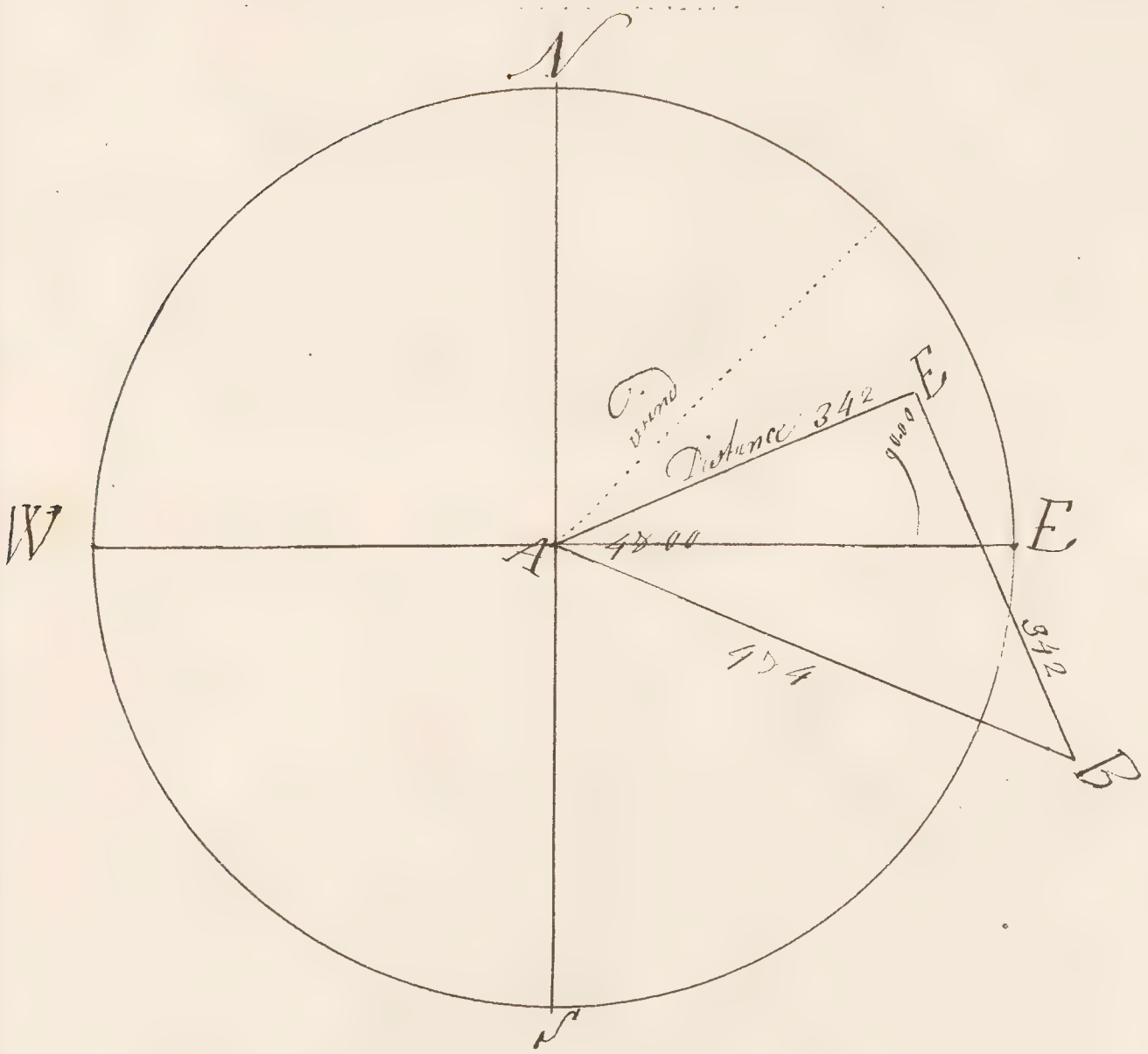
Admiral Ship is found to a Port bearing
from her Due East Distant 7¾ Miles, the
Wind is also East and the Ships are nearer
than Six Points — I Demand how distant
upon each Tack



as the Sine ∠ B	45.00	9.849485
is to the Side A E	342	2.534026
so is y° Sine ∠ E	90.00	10.000000
to the Side A B	484	2.684541

Case 2nd

Admiral Ship is bound to a Port bearing N.E. & Distant 342 Miles the wind is N.E. and she Makes her way good with Sixteen Points I Demand her Distance upon each Tack

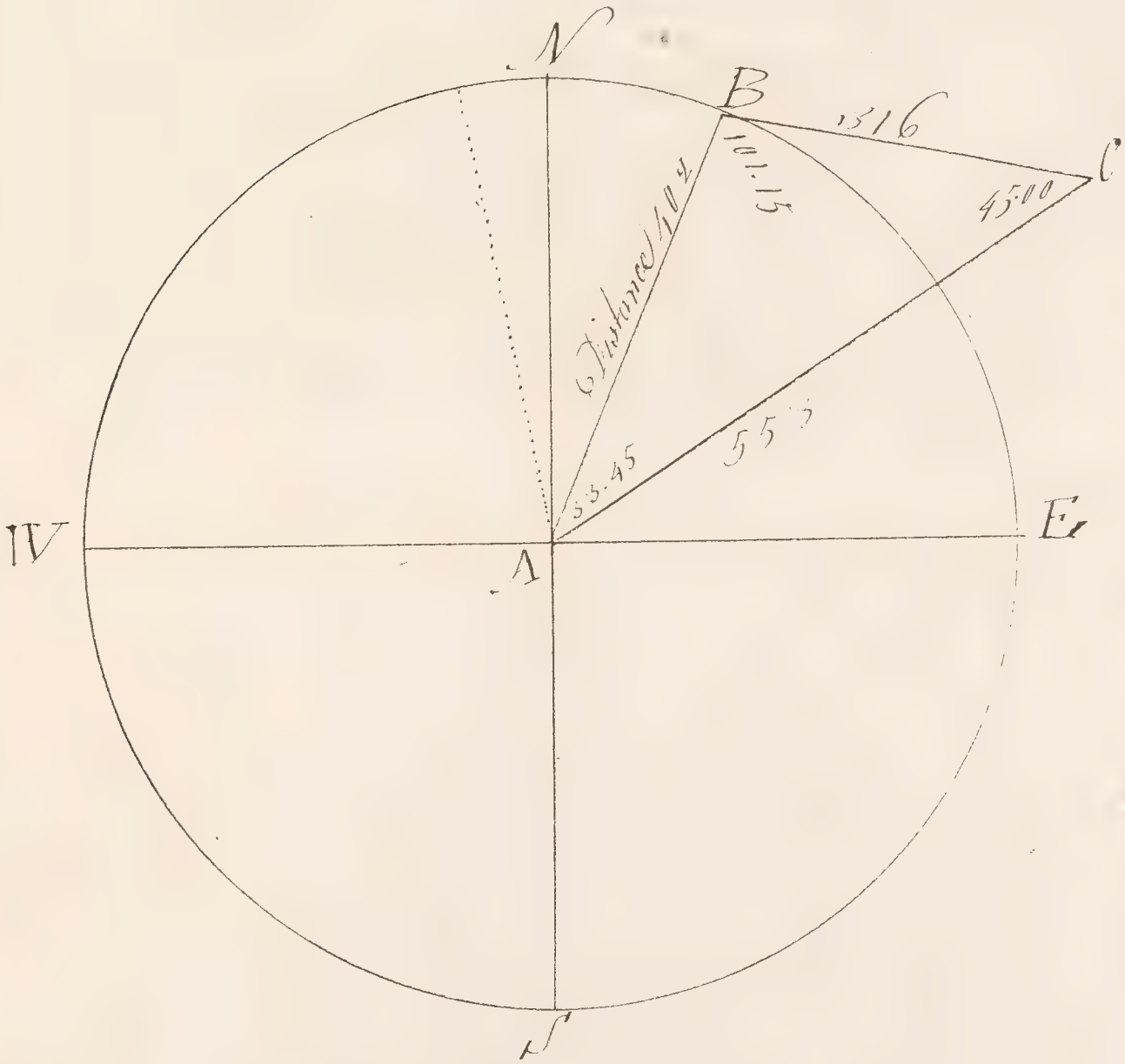


as the Sine ∠ C	45.00	9.849485
is to the Side AB	402	2.604226
is to y^e^ Sine ∠ B	101.15	9.991574
to the Side AC	558	2.746315

as the Sine ∠ C	45.00	9.849485
is to y^e^ Side AB	402	2.604226
as is y^e^ Sine ∠ A	33.45	9.744739
is to y^e^ Side BC	316	2.499480

Case 3

Admiral a Ship is bound to a Port bearing N.N.E
Distant 100 Miles the Wind is N.W. and
the Traders has way good within Six Points
I Demand her Distance upon each Tack

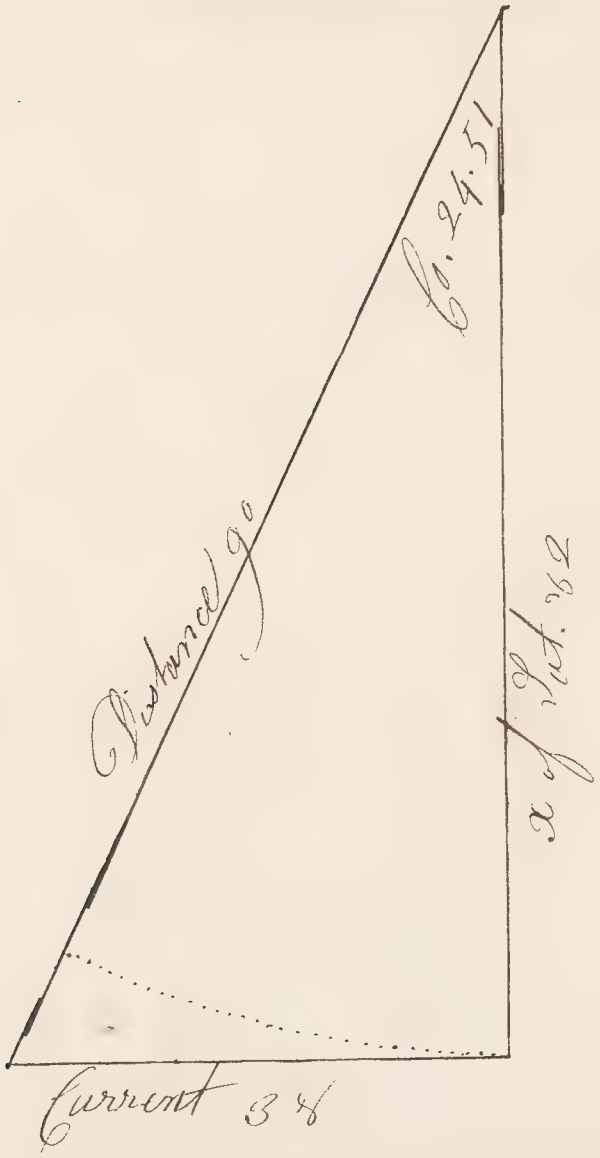


as the x of Lat.	82	1.913814
is to the Radius	90.00	10.000000
so is the Departure	38	1.579784
to the Tangent of ỹ course	24.51	9.665970

as Radius	90.00	10.000000
is to ỹ x of Lat.	82	1.913814
so is the Secant of ỹ course	24.51	10.042196
is to the Distance	90	1.955610

Current Sailing

Arrive a Ship in the Harbour Sails Due South 82
Miles; which time a Current Sets 38 Due East
I Demand the Ships Course, and Distance
Made good



as Radius 90.00 : S. Co. Co. 22.30 :: Dist 98 : Diff. 37

as Radius 90.00 : S. Co. 67.30 :: Dist. 98 : Deper. 89

as Radius 90.00 : S. Co. Co. 67.30 :: Dist. 34 : x of Lat. 31

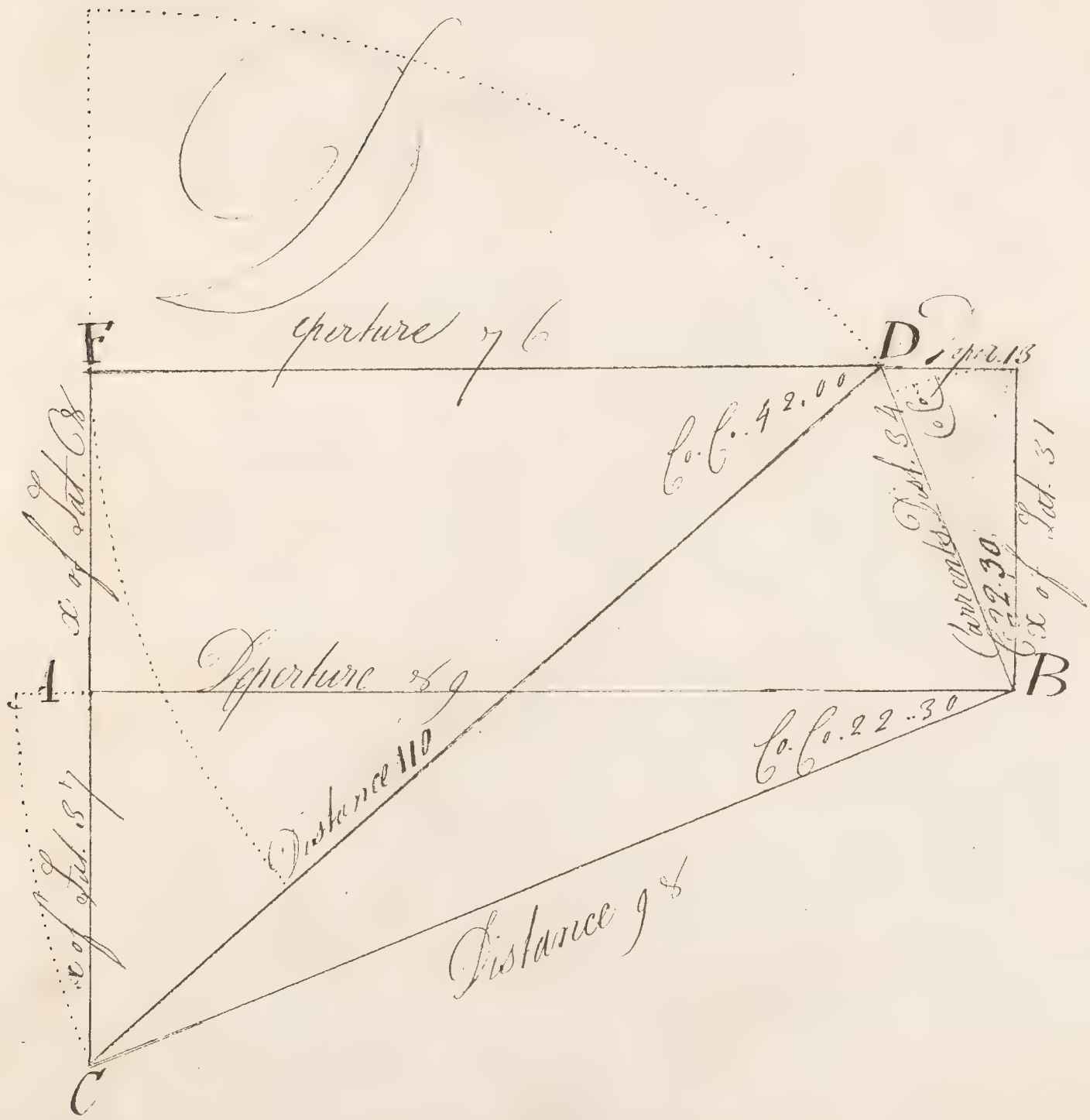
as Radius 90.00 : S. Co. 22.30 :: Dist. 34 : Deper. 13

as 8 : Deper. 76 : x. of Lat. 68 :: Rad. 45.00 : S. Co. Co. 42.00

as Radius 90.00 : S. Co. Co. 42.00 :: x of Lat. 68 : Dist. 110

Ast 2nd

Admits a Ship in 24 hours Sails 176 & 8 Miles
during which time a Current Sets N.W. 3/4 W. Distance
Bearing & her Course, Distance, and Dep.
Made good _____



as Radius 90.00 : S. Co. 33.45 :: Dist. 102 : Depart. 56

as Radius 90.00 : S. Co. Co. 56.15 :: Dist. 102 : x Lat. 84

as Radius 90.00 : S. Co. 33.45 :: Dist. 41 : Depart. 23

as Radius 90.00 : S. Co. Co. 56.15 :: Dist. 41 : x Lat. 34

as y° x Lat. 50 : Depart. 79 :: Rad. 45.00 : S. Co. Co. 32.15

as Radius 90.00 : S. Co 57.15 :: Depart. 79 : Dist. 94

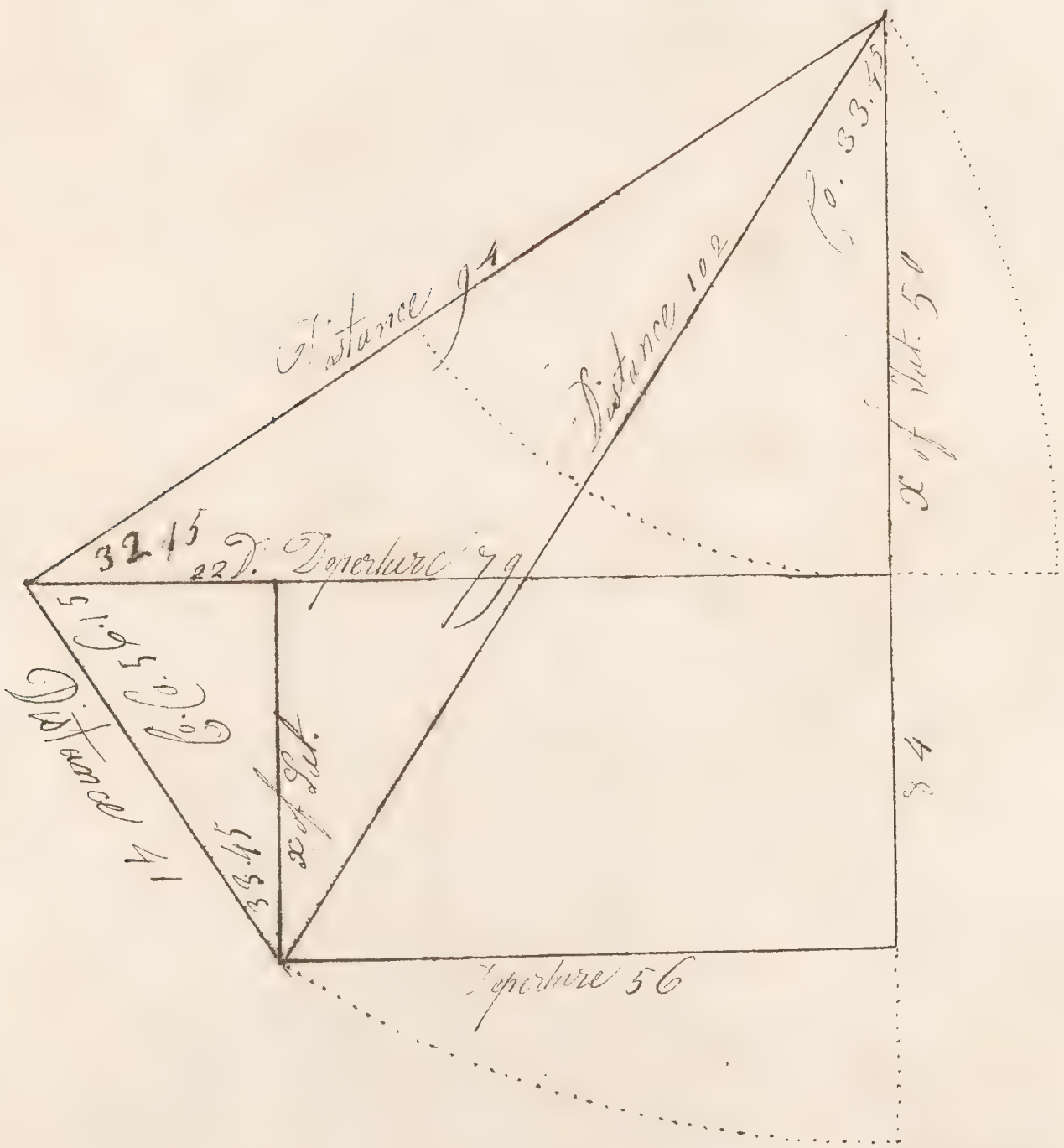
Dist 3

Domin a Ship in 2 h hours Sail. 102 Miles

Spring which time a Current Set N W B N 4 Miles

I Demand her Course, Dist, Departure, and Lat

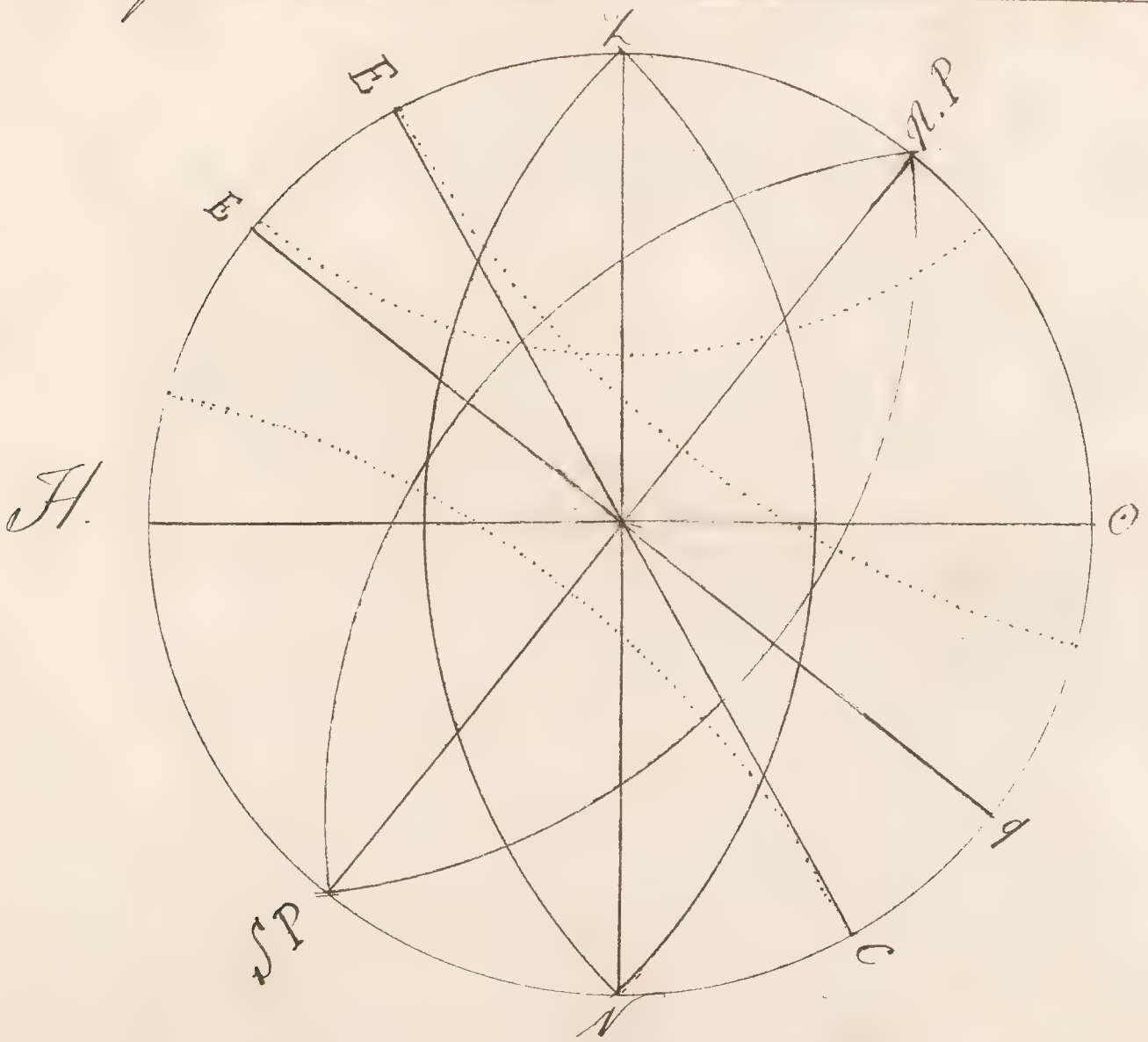
Made good



Astronomical Problems

Prob. 1

To Projects the Sphere upon the Plane of the Meridian — Lat. 51. 30 N.



March 20 Aries $\frac{0\ '}{00.04}$

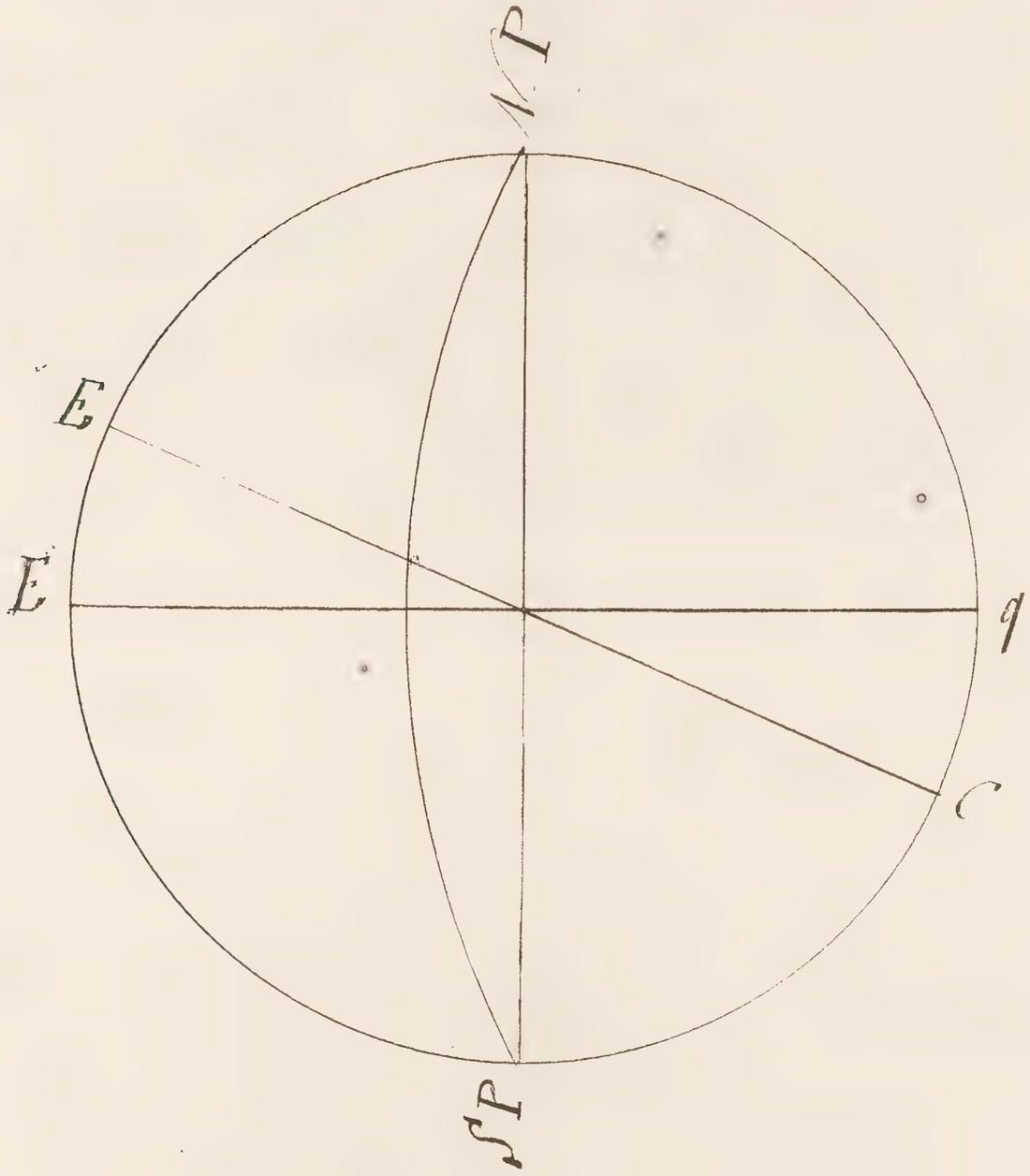
Days
March 11
April 19
30 Days

Suns Motion in the Ecliptick for one Day $\frac{'\ ''}{59.08}$
5
4.55.40
6
29.34.00
00.04.
29.38.00

Prob. 2

To find the Latitude & Long. of Paris

by the Year 1763

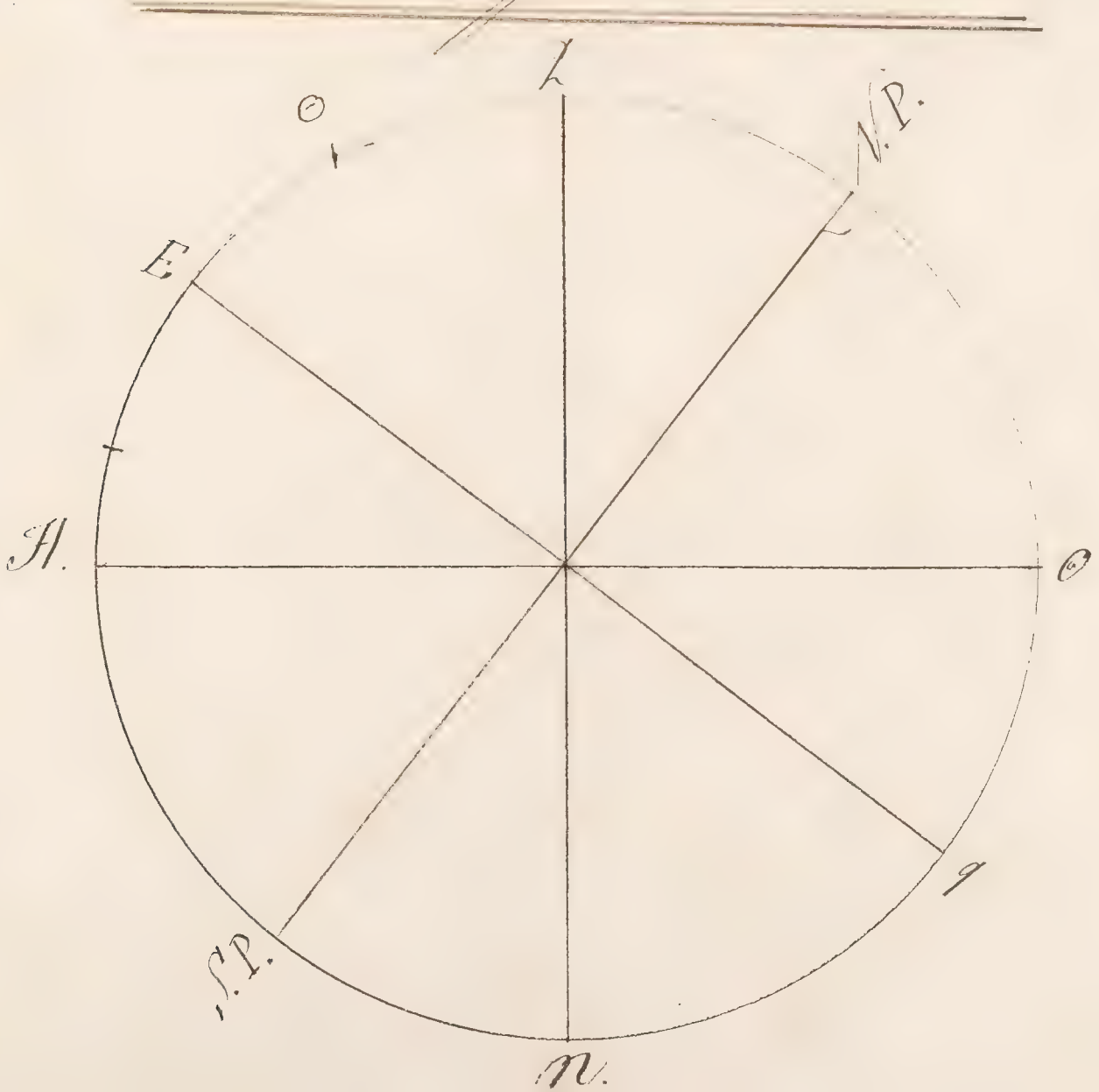


Greatest Meridian Summer Altitude	61. 16
Least Winter Meridian Altitude	14. 16
Diff. of Extreams	47. 00
Greatest Declination	23. 30
Winter Altitude	14. 16
Complement of the Latitude	37. 46
a Quadrent	90. 00
Latitude of Ipswich	52. 14

Prob. 23.

From the Sun's greatest and least Meridian Altitudes to find the Latitude and greatest Declination.

Admit in the Town of Ipswich the Sun's greatest Summer Meridian Altitude is found to be 61° 16' and the least in the Winter Season 14° 16' From hence the Latitude and the Sun's greatest Declination



as the Sine	90.00	10.000000
is to the Sun's Longitude	41.45	9.823397
so is y^{e} Sine Sun's Greatest Declin^{n}	23.30	9.598660
is to the Sine Sun's Present. Declin^{n}	15.20	9.422057

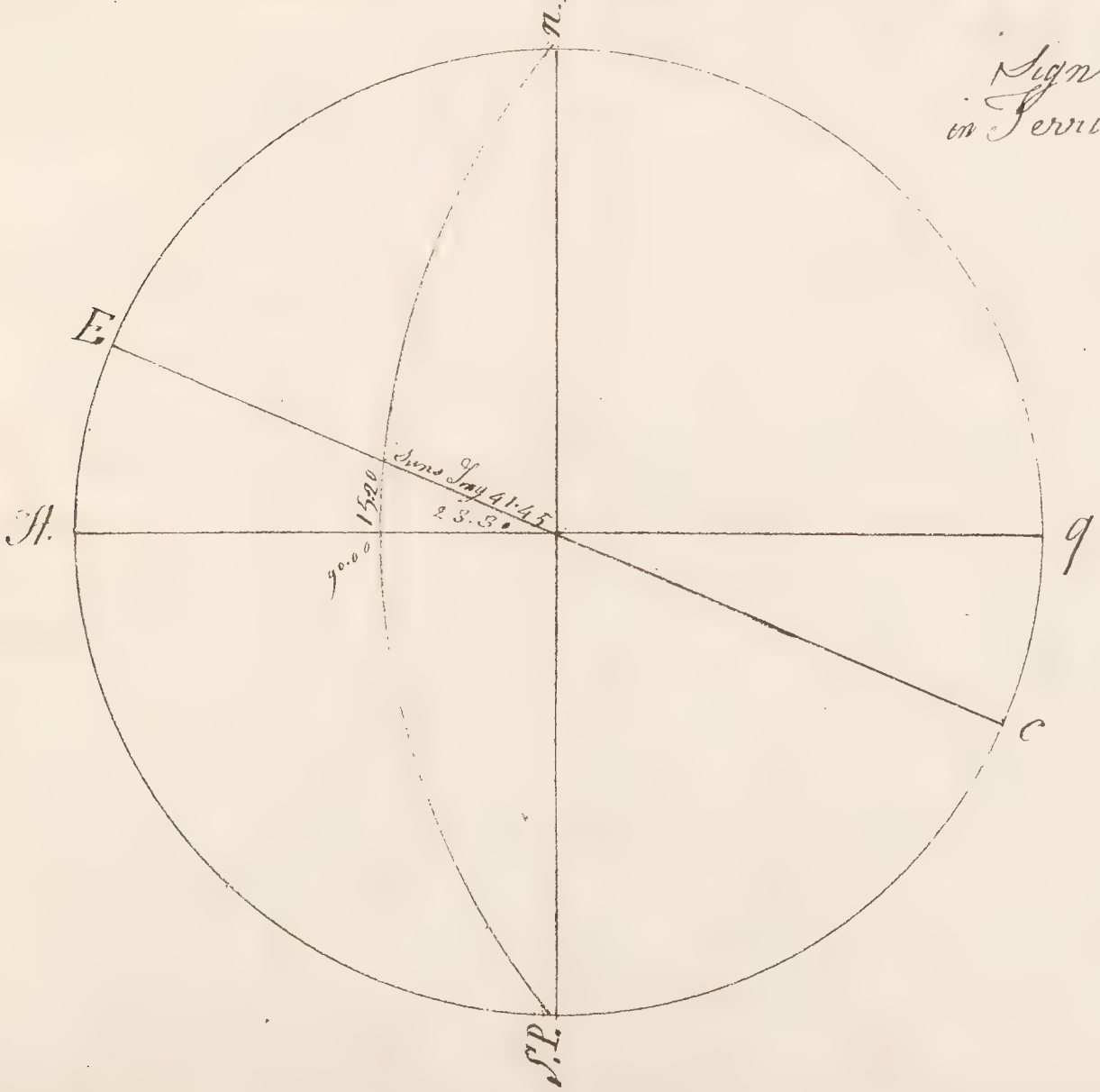
Plate 4

Given the Suns Longitude
and Greatest Declination
to find the Present Decl.

Suns Longitude in Taurus
11.45 Greatest Decln. 23.30

Required the Suns Present Decl.

Sign Aries 30.00
in Taurus 11.45
41.45

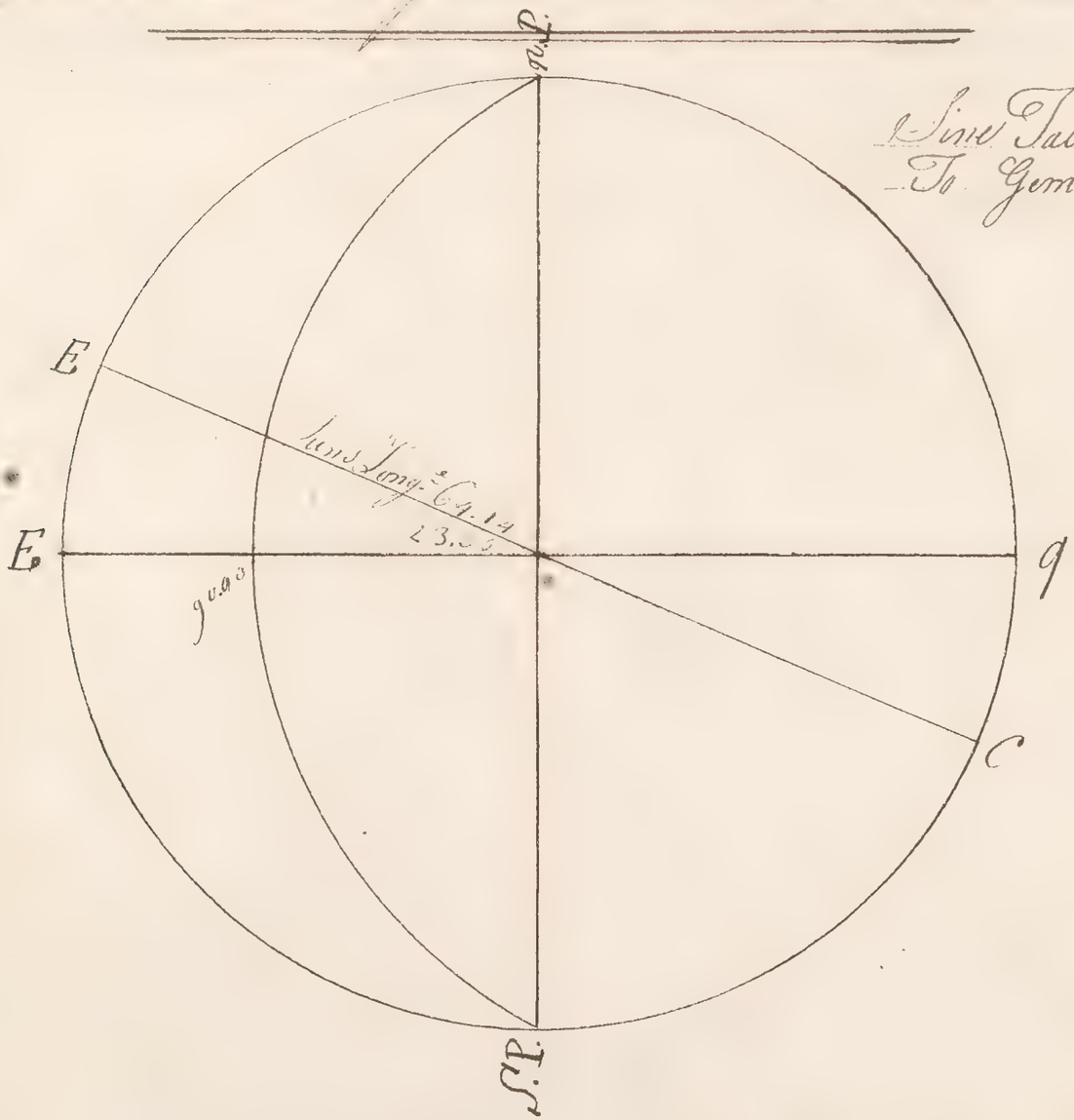


as the Sine	90.00	10.000000
is to y^e Sine Sun's Longitide	64.14	9.954518
so is y^e Sine Sun's Greatest Declination	23.30	9.600700
to y^e Sine Suns Prasent Declination	21.08	9.555218

Prob. 5th

Given the Sun's Longitude and Greatest Declination — To find the Present Declination

Suns Longitude in Gemini 4°. 14°
Greatest Declin. 23.30 — I Demand the Suns present Declination



Sine Taurus 60.00
To Gemini 4.14
64.14

			° ′	
90.00	June	21. 1753	23.29 No.	90.00
51.31	London Lat.		51.31 No.	2.3.29
38.29				66.31

as the Sine Co. Co.	38.29	9.7 9 3 9 9 1	
is to y^e Sine Suns Declination	23.29	9.6 0 0 4 0 9	
so is y^e Sine	90.00	10.0 0 0 0 0 0 0	
to y^e Sine Suns Amplitude	40.00	9.8 0 6 4 1 8	

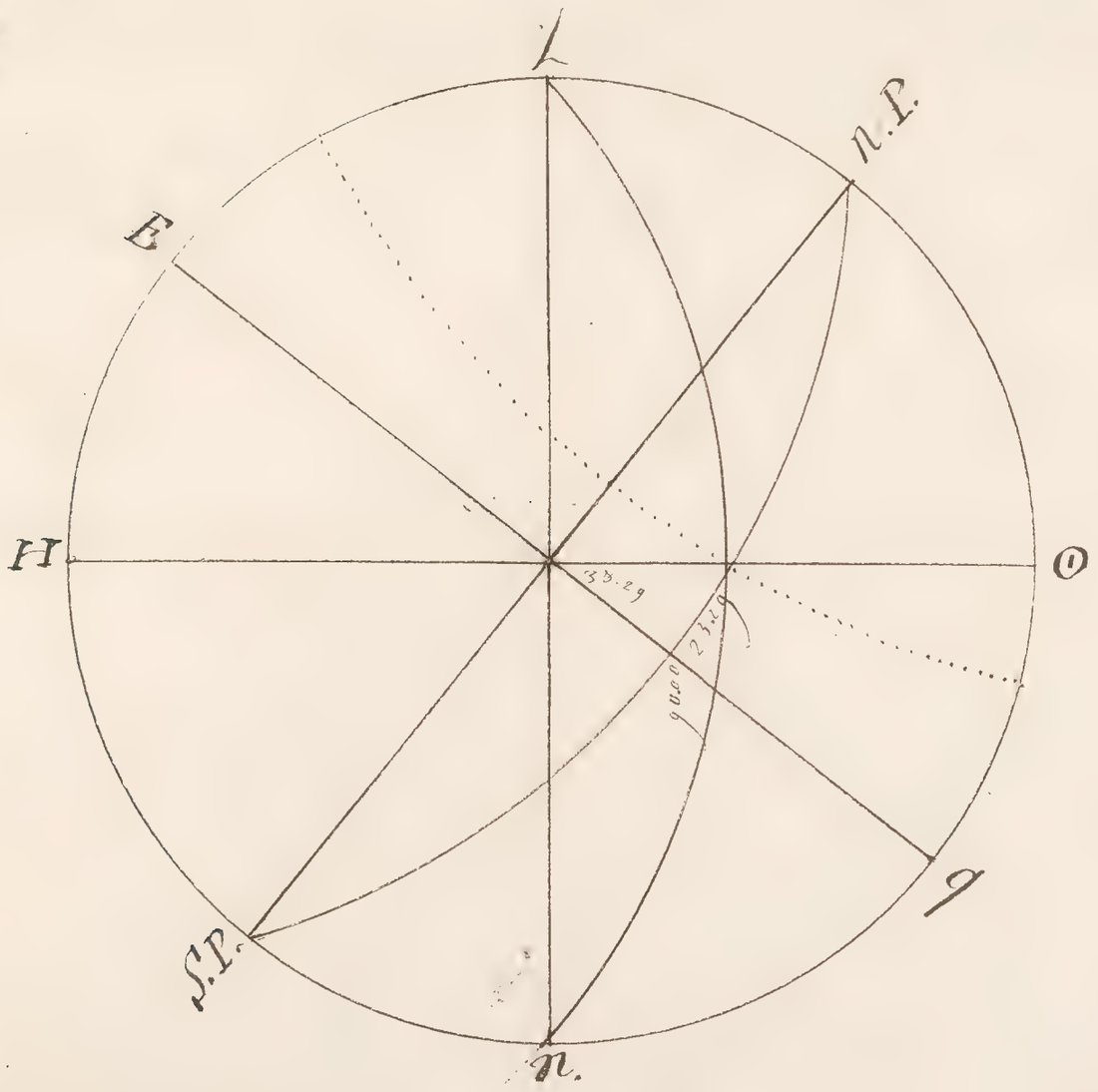
Amplitude is an Arch of the Horizon Comprehended between the Meridian in which the Sun or Star Rises or Sets; and the East or West Point

Prob. 6th.

Given the Latitude and Declin.
to find the Amplitude

London. and 21. 1753

Demand the Amp.



90.00	December 21. 1753	23.29 S.	90.00
23.29	London Sol.	51.31 N.	51.31
66.31			38.29

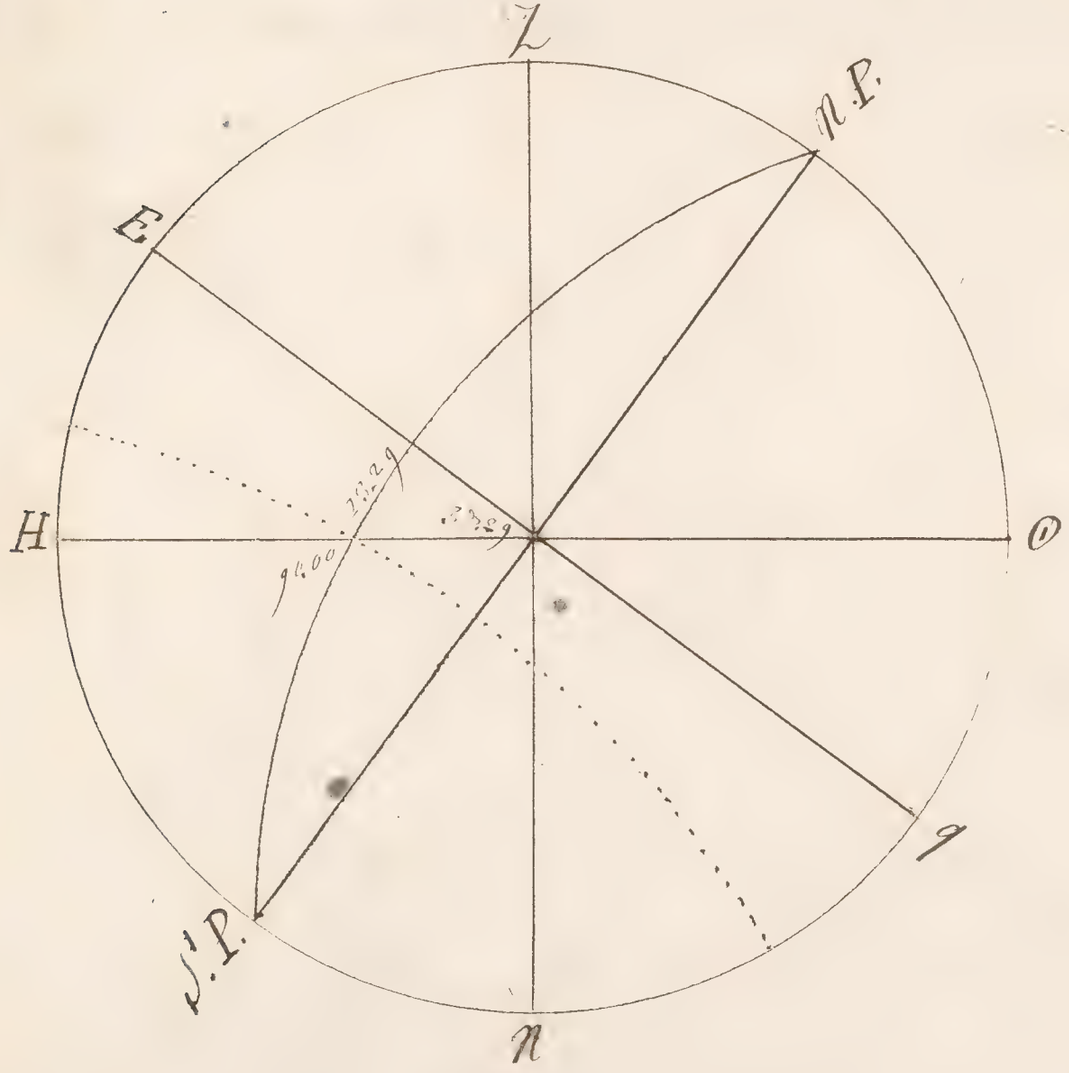
as the Sine Co. Lat	38.29	9.7935991	
is to the Sine Sun's Declination	23.29	9.6004409	
so is the Sine	90.00	10.0000000	
to y^e Sine Suns Altitude	40.00	9.8064418	

Prob. 4th

Given the Latitude and Declination of the Sun's attending Star

London December 21st 1753

Demand the Sun's attending Star



90.00	May 28. 1753	21.33 N.	90.00	
21.33	Cape St. Vincent	36.53 N.	36.53	
68.27			53.07	

as the Sine Co. Co. Latitude ..... 53.07 ..... 9.903013
is to the Sine Sun's Declination ..... 21.33 ..... 9.565036
so is the Sine ..... 90.00 ..... 10.000000
to the Sine Suns Amplitude .. 27.22 ..... 9.662023

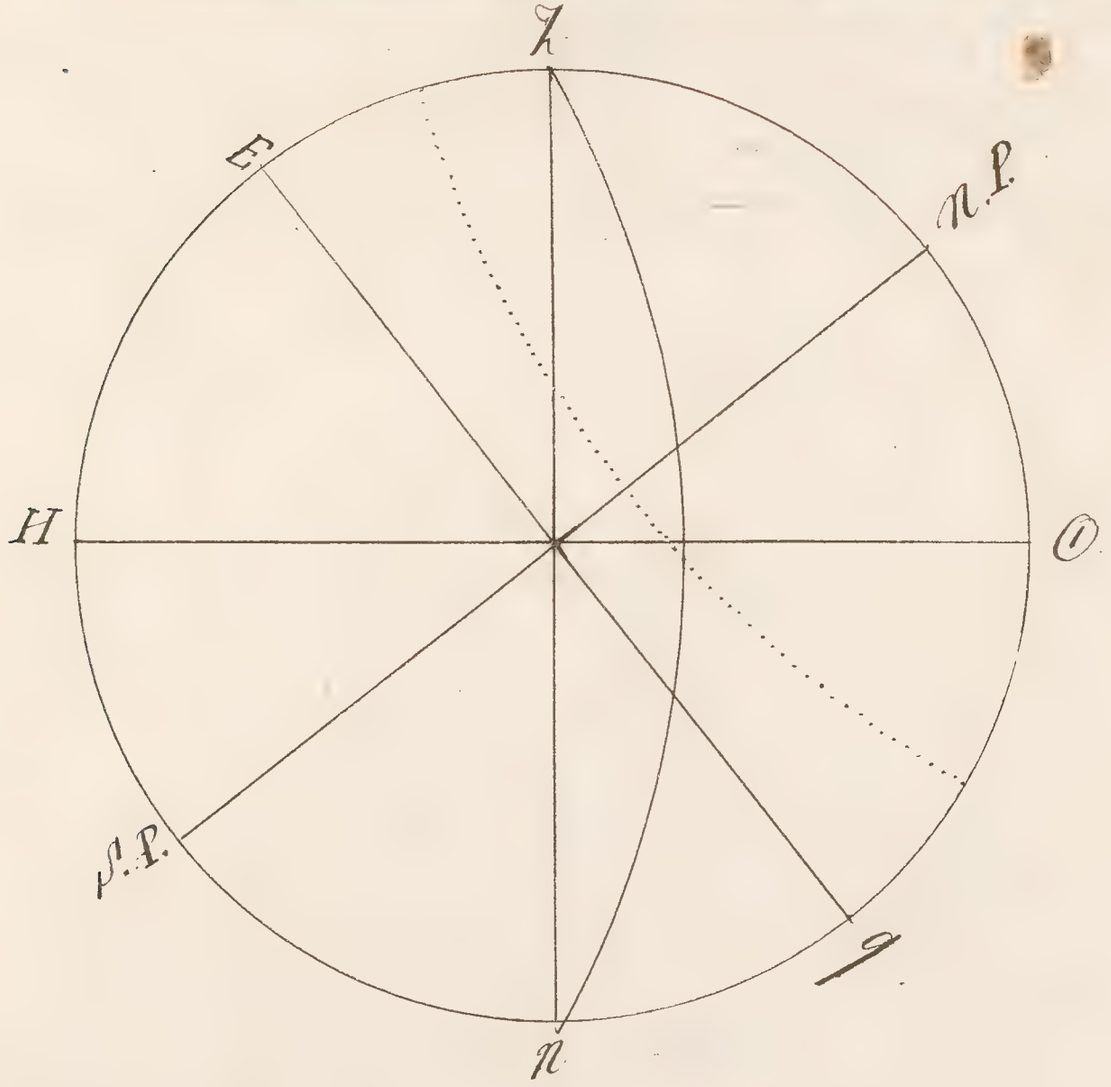
Plate 8th

Sun's Declination and Declination

Sun's Rising and Amplitude

at St. Vincents May 28th 1773

Diurnal Arc, and Amplitude



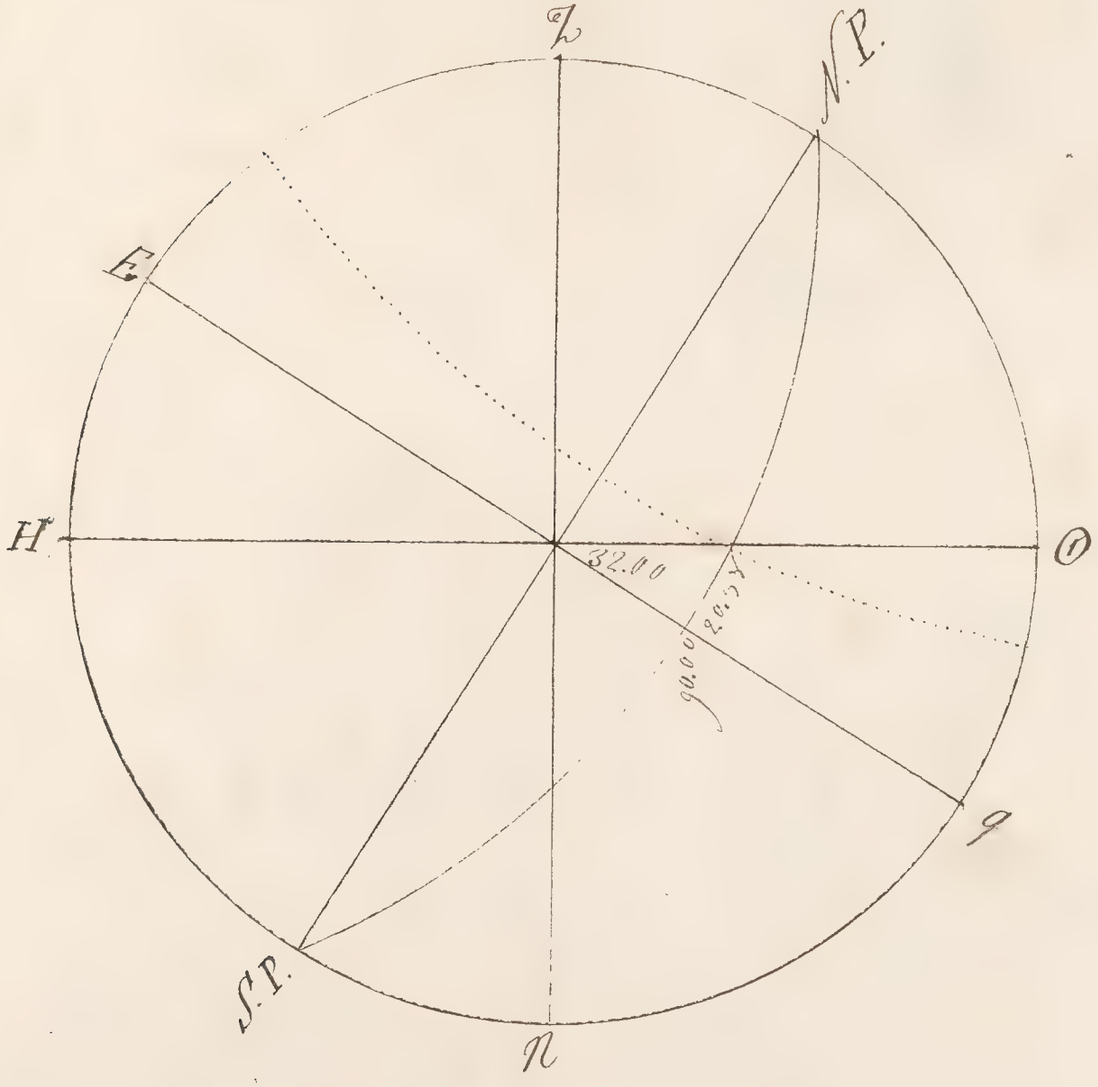
		° ′	
90.00	May 22. 1753. Declin.	20. 38 No	90.00
58.00	Naze of Norway. Lat.	58. 00 No.	20.38
32.00			69.22

as the Sine Co. Lat. ..... 32.00 ..... 9.724210
So is to Sine Suns Declination 20.38 ..... 9.547019
So is the Sine ..... 90.00 ..... 10.000000
to the Sine Sun's Amplitude 42.00 ..... 9.823809

Vol. 9

Given the Latitude and Declination to find the Sun's Amplitude

Demand the Sun's Amplitude at the Haze of Norway May 29th 1793



90.00
23.29
66.31

Ipswich Latitude 52.14 No
June 20. 1753 Declin. 23.29 No

90.00
52.14
37 46

14.10 Co Altitude 0.153056
37.46 Co Latitude 0.212931
66.31 Co Declin.

148.57 Sum 9.983940
74.28 Half Sum
7.57 Diff.

9.140850

19.496677 Sum
9.748338 Half Sum.

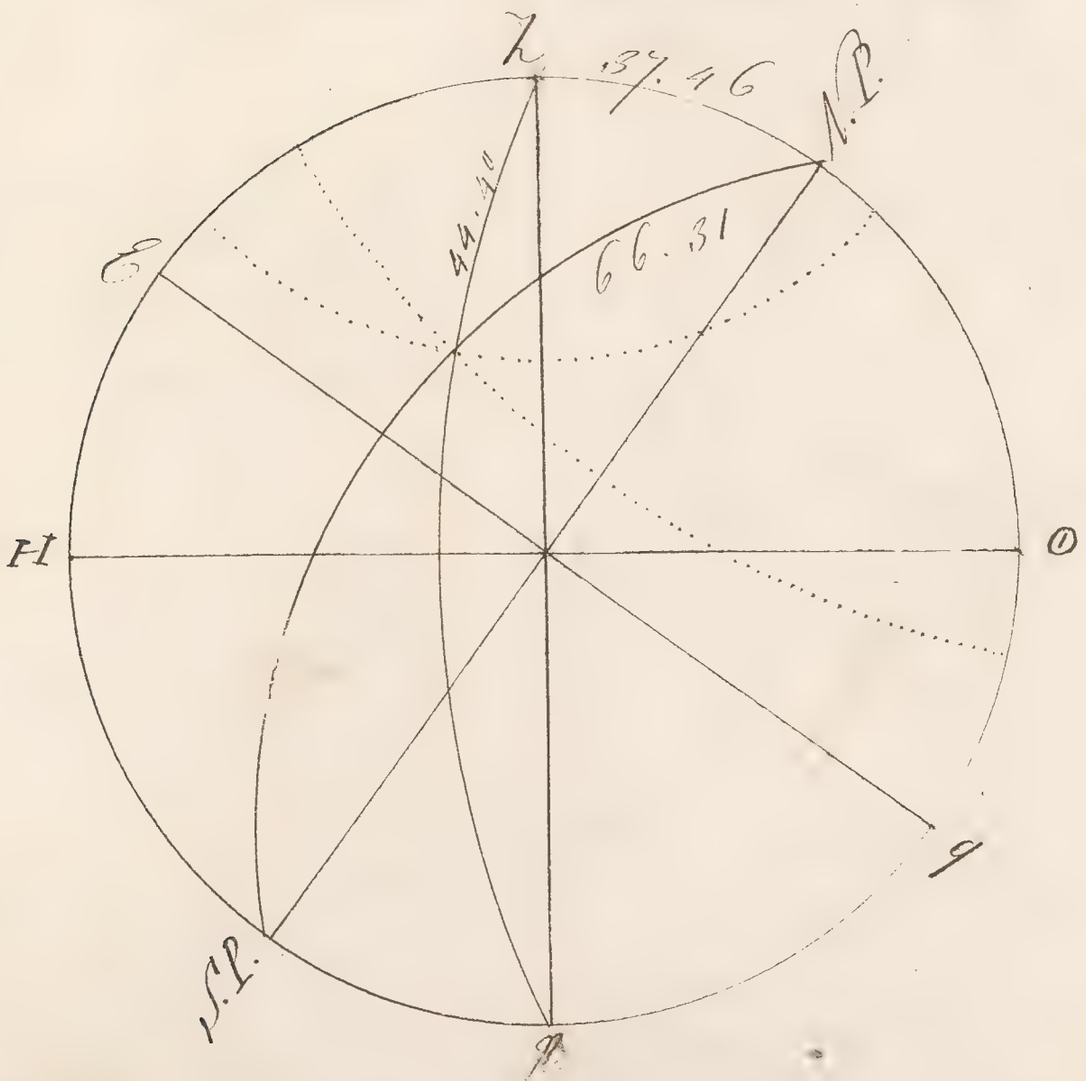
33.48
33.48
67.36 Double
180.00
112.24
90.00
22.24

Prob. 16th

Given the Lat. & Hour and Declin
to find the Sun's Azimuth

Suppose Lond 20th 17h 53m AM. Lat 52° 0'

Demand the Sun's Azimuth



90.00	90.00	Ipswich Latitude	52.14 No.	90.00
52.14	19.49	November 20. 1753 Declination	19.49 So.	15.30
37.46	109.49	Suns Altitude	15.30	74.30

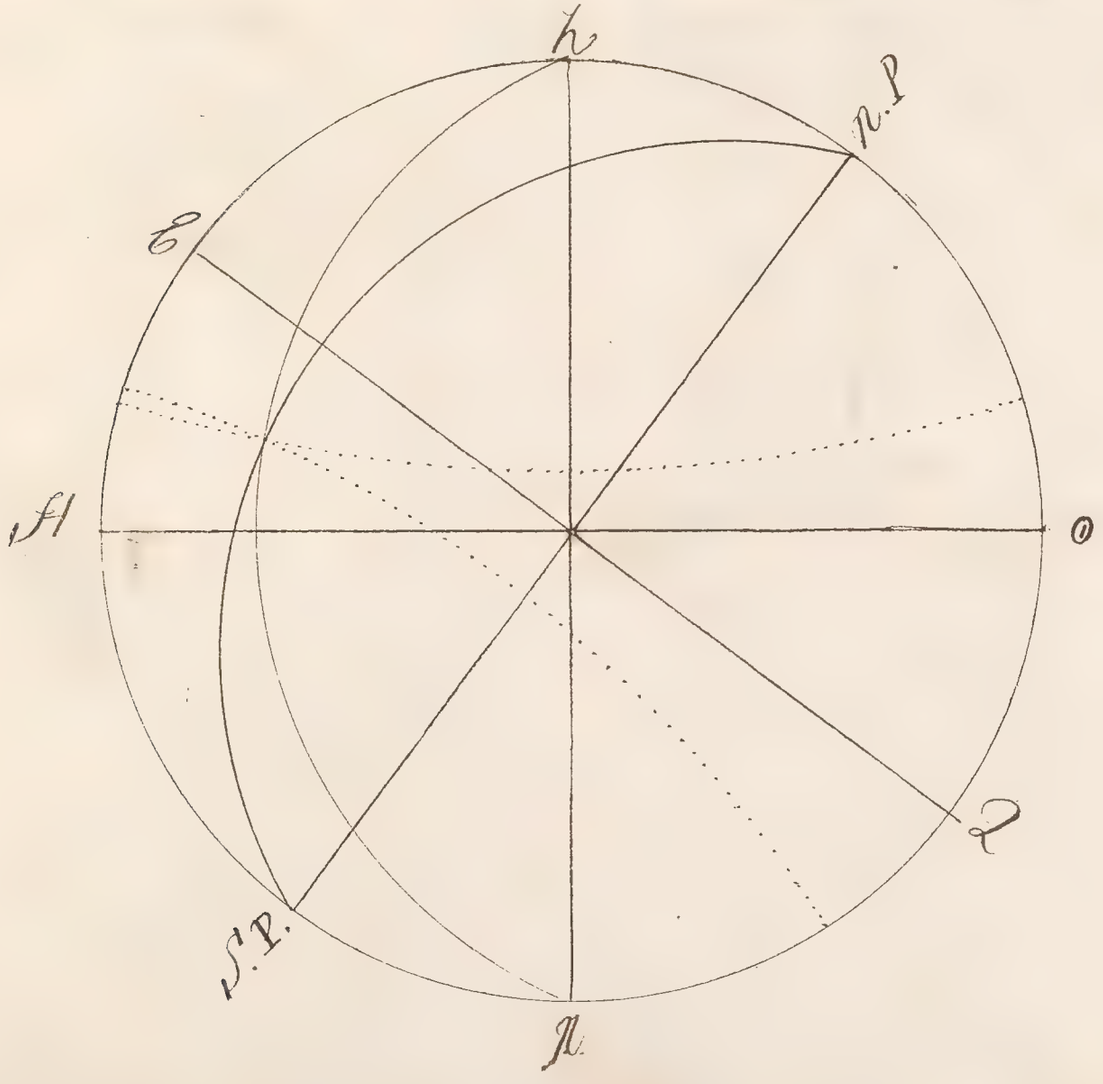
74.30	Co. Altitude	0.016.090
37.46	Co. Latitude	0.222694
109.49	Co Declin.	
222.05	Sum.	
111.02	Half Sum	9.963919
1.13	Diff.	9.327016
		2)18.529919
10.36		9.264959
10.36		
21.12	Double	

the Azimeth from No. 180.00
158.46
90.00
68.46

Prob. 11th

Given the Lat. Altitude and Decl.
To find the Sun's Azimuth

Ipswich Novem. 20th 1795
Sun's Altitude 15° 30' P.M.
Demand the Azimuth.



° ′	° ′	° ′		° ′
90.00	90.00	90.00	London Latitude	51.31 N°
51.31	22.16	44.17	June 2. 1753 Declin^{n}	22.16 N°
38.29	67.44	45.43	Suns Altitude	44.17

45.43	Co.	Altitude	0.145150
38.29	Co.	Latitude	0.206168
67.44	Co.	Declination	
151.56		Sum	
75.58		Half Sum	9.986841
8.14		Difference	9.155957
			2)19.494116
			9.747058

33.58
33.58
67.56
180.00
112.04
90.00
22.04

Prob. 19th

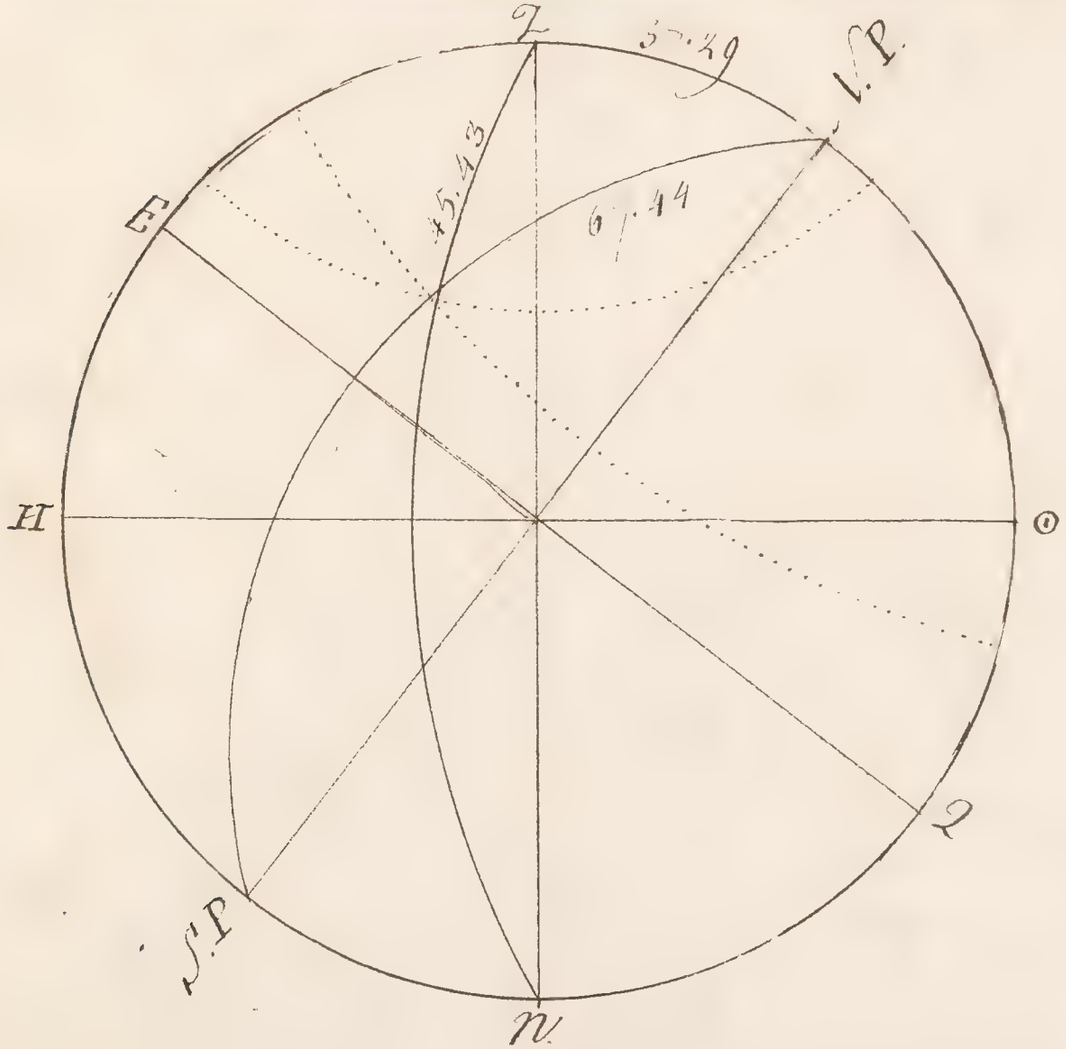
Given the Lat. of Place and Declin.

To find the Amir. Azimuth

London June 2nd 1753

and Watch 4 h. 17 A.M.

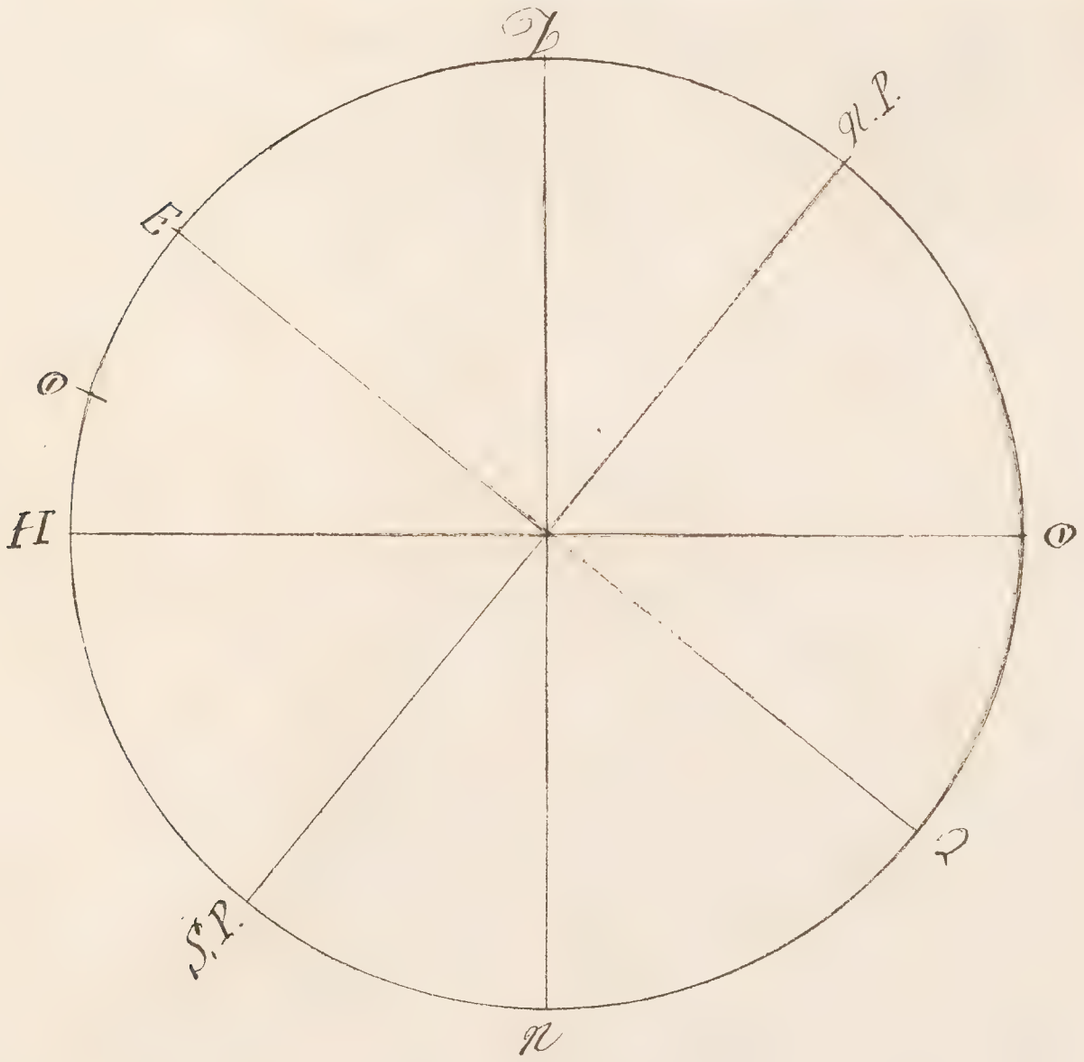
Demand the Azimuth



Zenith Distance 72. 14 So.
December 7. 1753 Declin. 22. 42 So.

Suns Zenith Distance 72. 14
Suns Declination 22. 42
the Latitude 49. 32 N.

Meridional Observations



(x) Zenith Distance ° ′ 28. 28 So.
May 29. 1753 Declination 21. 41 No.

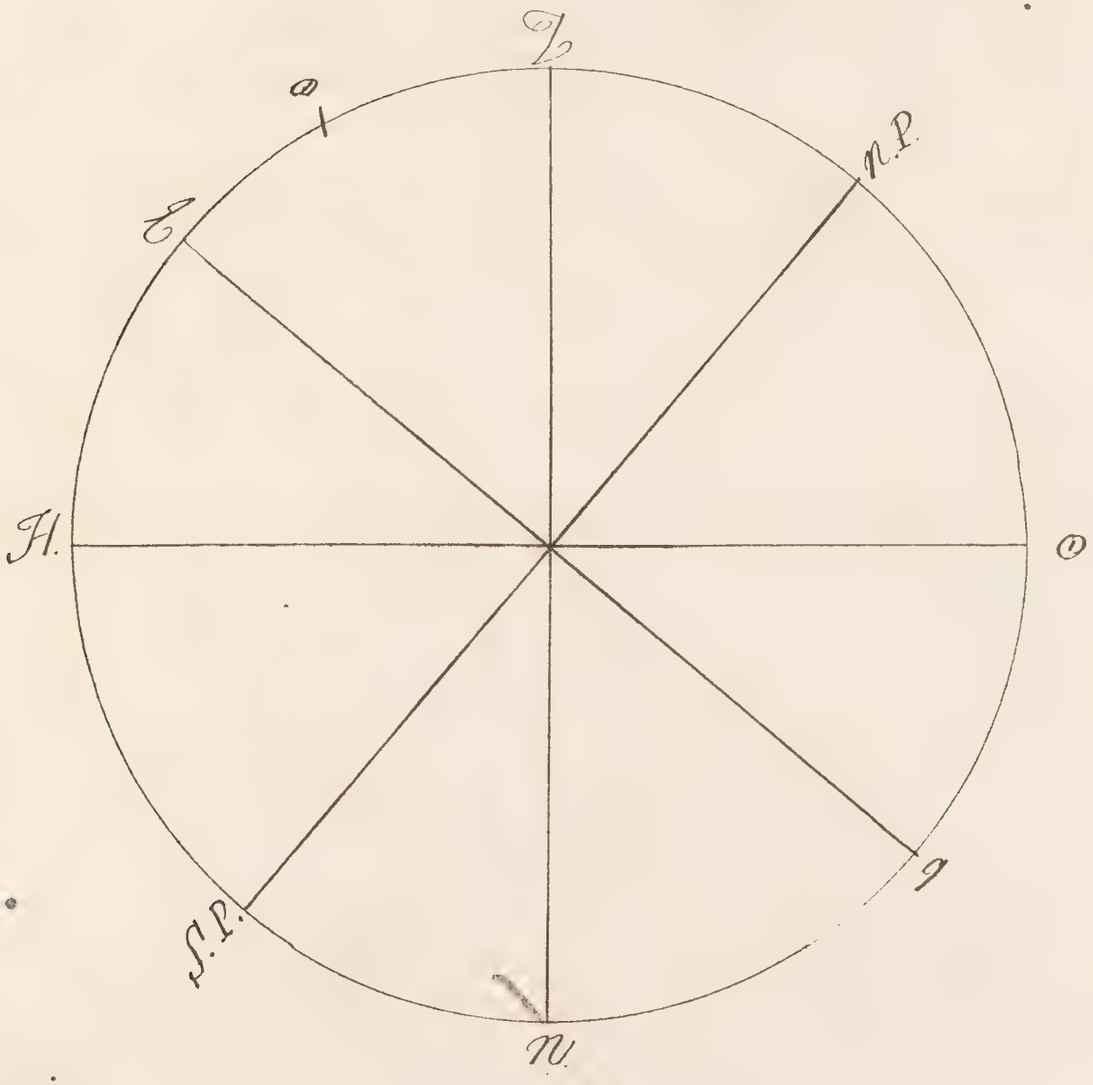
Suns Zenith Distance ° ′ 28. 28
Suns Declination 21. 41
the Latitude 50. 09 So.

Tab. 2da

Lunar Distance 78° 28' 0"

May 29th 1775

Sigmund Bacstrom



	° ′
Zenith Distance	09.12 No
June 2. 1753 Declination	22.16 No

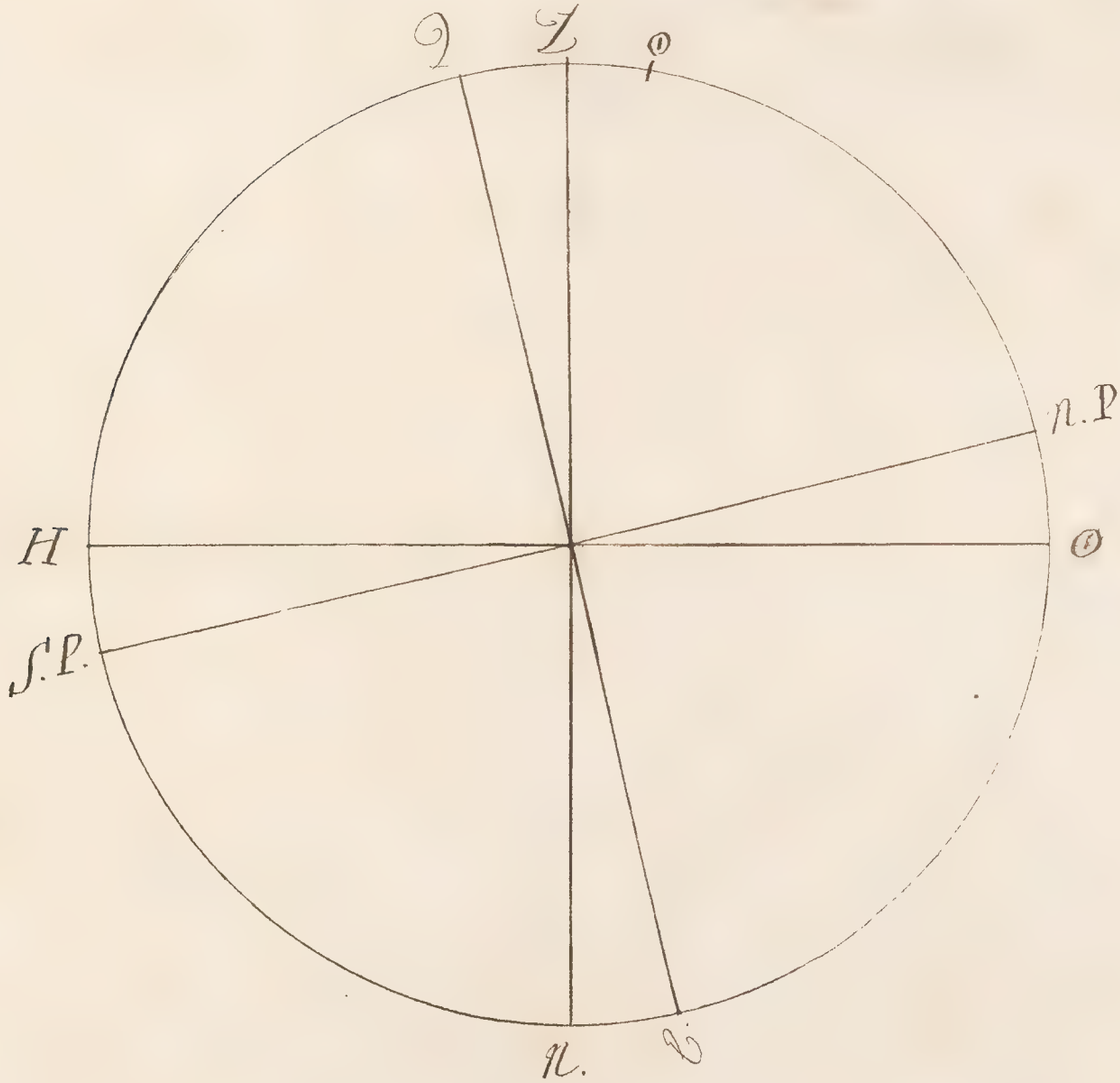
Suns Zenith Distance 09.12 No.
Suns Declination ... 22.16 No
the Latitude ..... 13.04 No

A. H. 3

Zenith Distance 89° 12′ 4″

Sund Sud 1′ 53″ 3

Diamond Hill Feb. 3rd.



	°	′
Zenith Distance	11.	02 S
Nov.r 12. 1753 Declin.n	17.	51 S

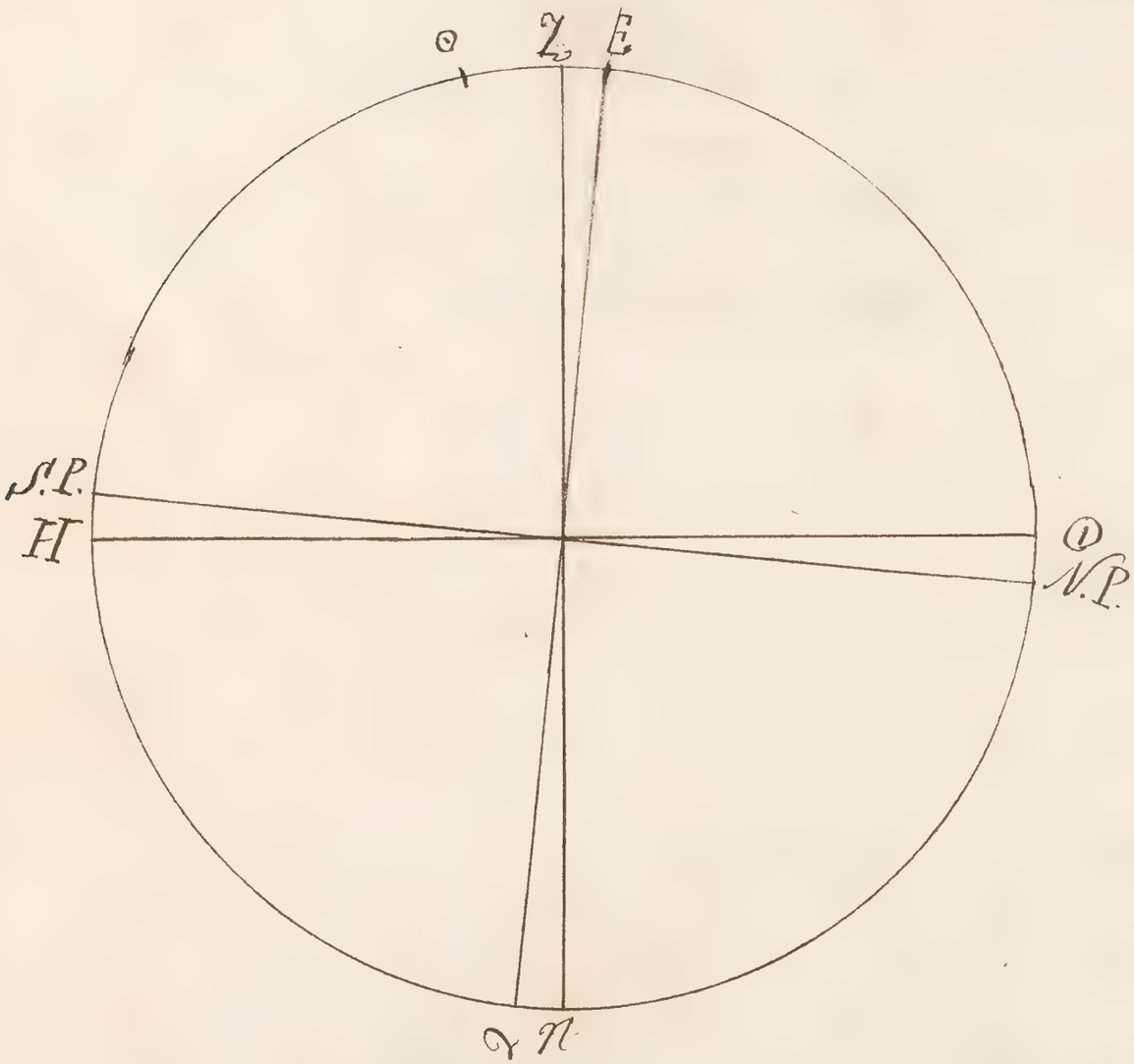
Suns Zenith Distance	11.	02
Suns Declination	17.	51
The Latitude	5.	49 S

Ast 1

Zenith Distance 11° 02′ S

Nov.r 19 — 1793

Hour Line Latitude



Remarks

The Variation of the Compass is known
that the Magnetical Needle makes with
the Meridian

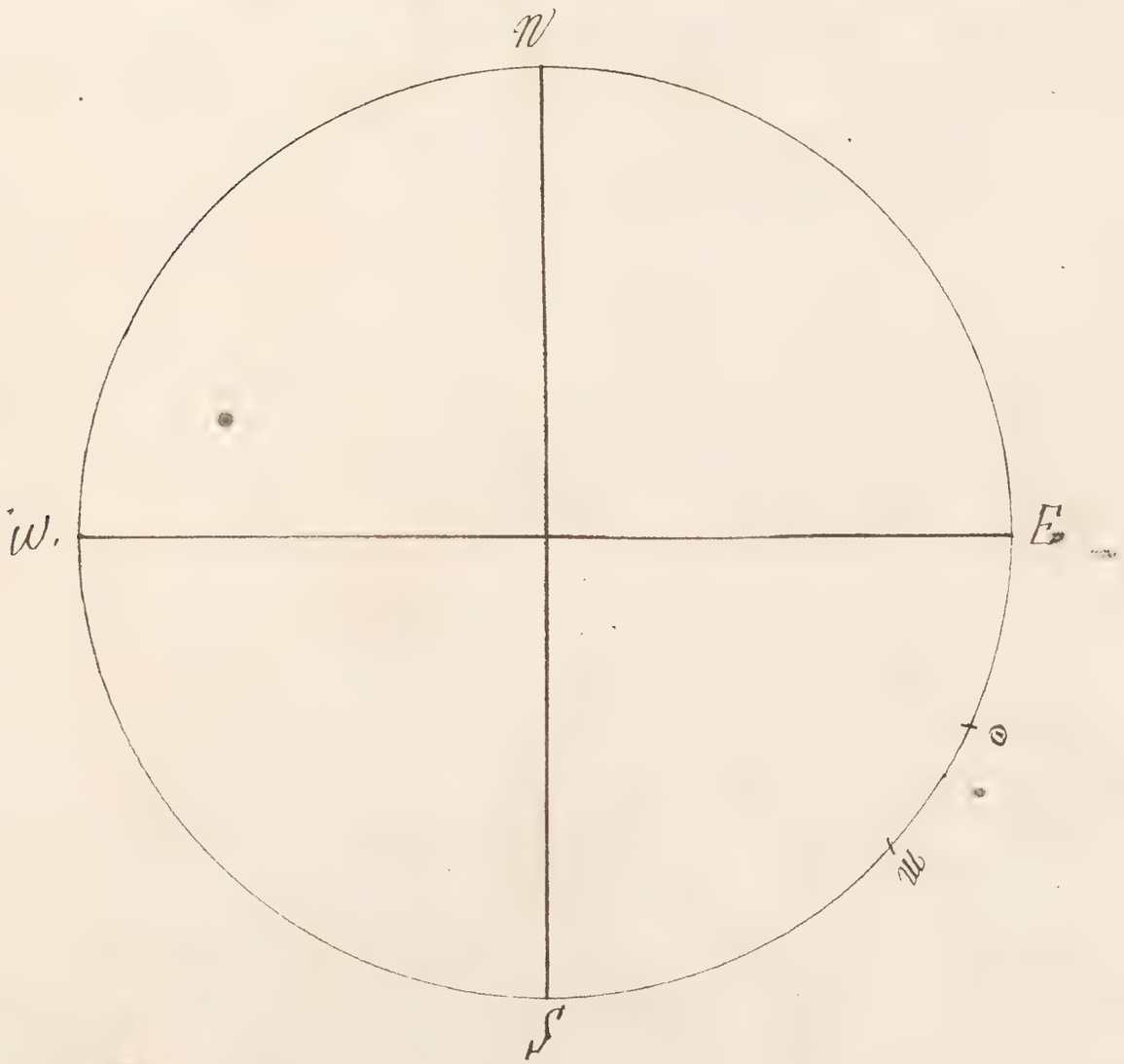
6.

Magnatical	41.41
True	24:24
Diff Variation W.	17:17

Variation of ♈ Compass

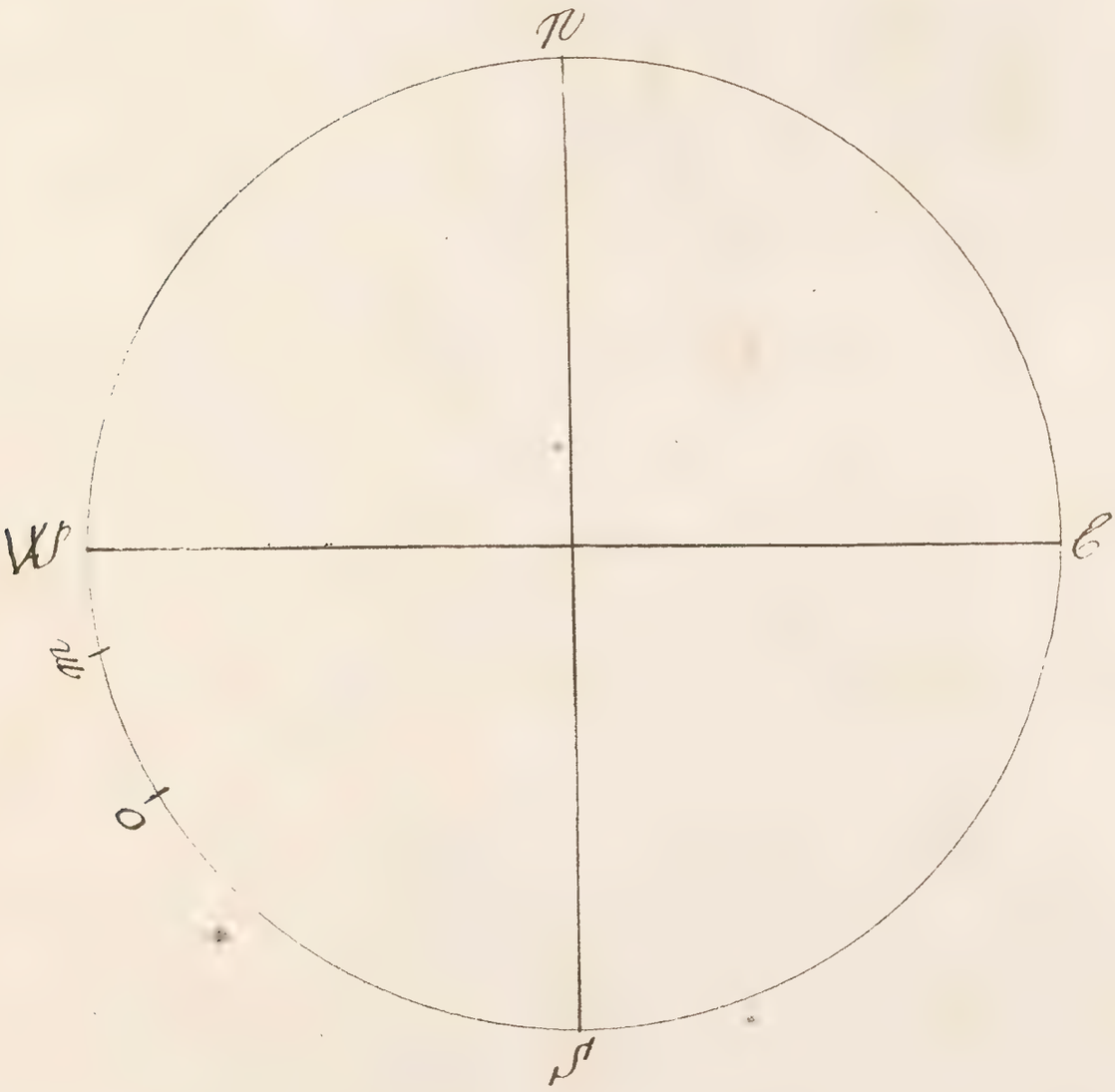
Amt. Am. Ship. { Magnetical 6h. 6l. S°
East ——— 6 2h. 2h. S°

Remarks on the Quantity and Quality of the Variation



True	W	30.13
Magnatical	W	12.24
Diff Variation	W	17.49

Amt. Sun's
True West 30. 63 So
Magn. West 12. 24 So
Required the Variation



True.... E 10.10 So.

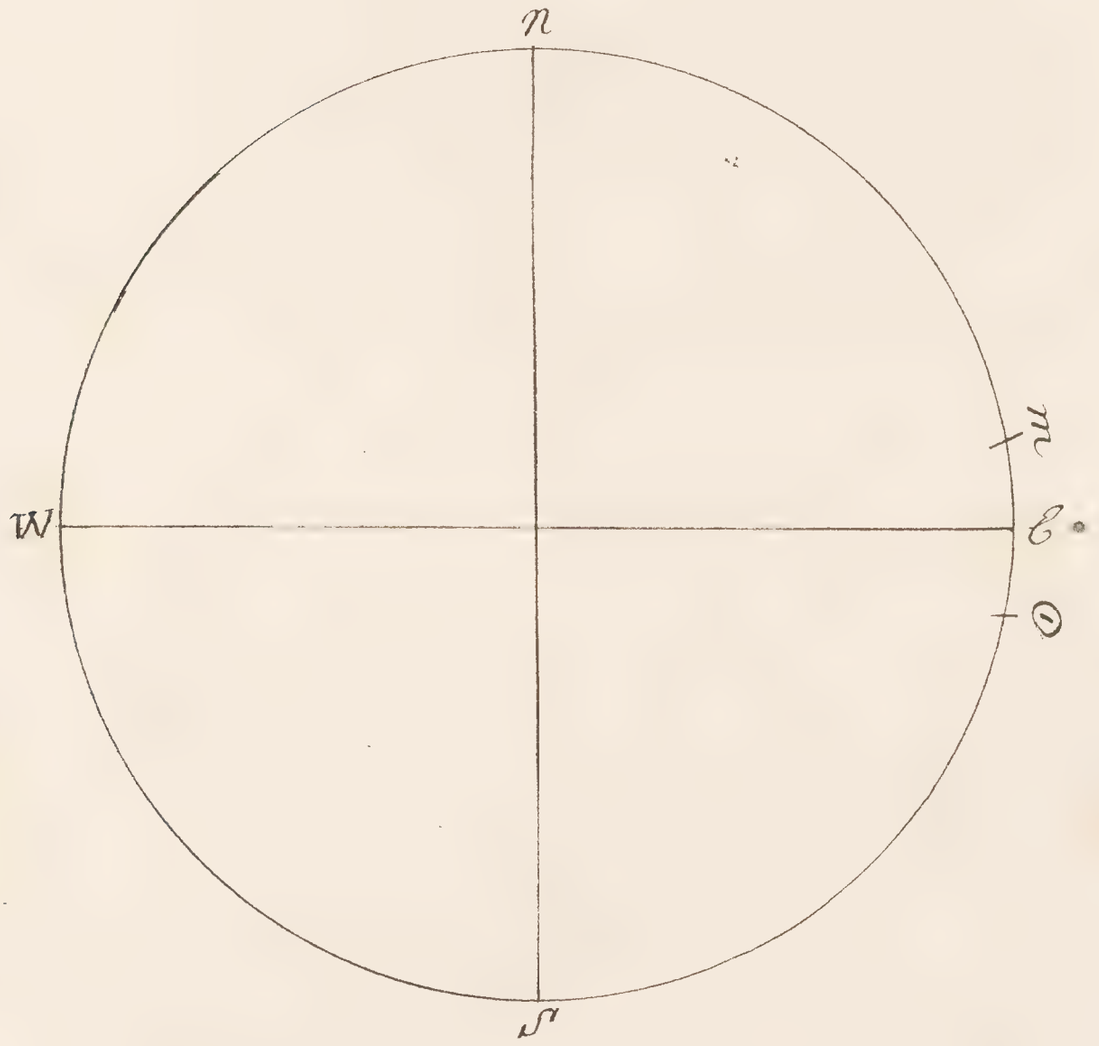
Magnatical.. E 10.24 No

Variation.. E 20.34

Del 3

Time of Observation { True 6.10.10 So
Mean 6.10.24 Ap

Demand the Variation



A Journal

By God's Permission

The Ship Panther

From England towards

Madeira

Capt. Jn.° Bonline

Commander

By W. W.

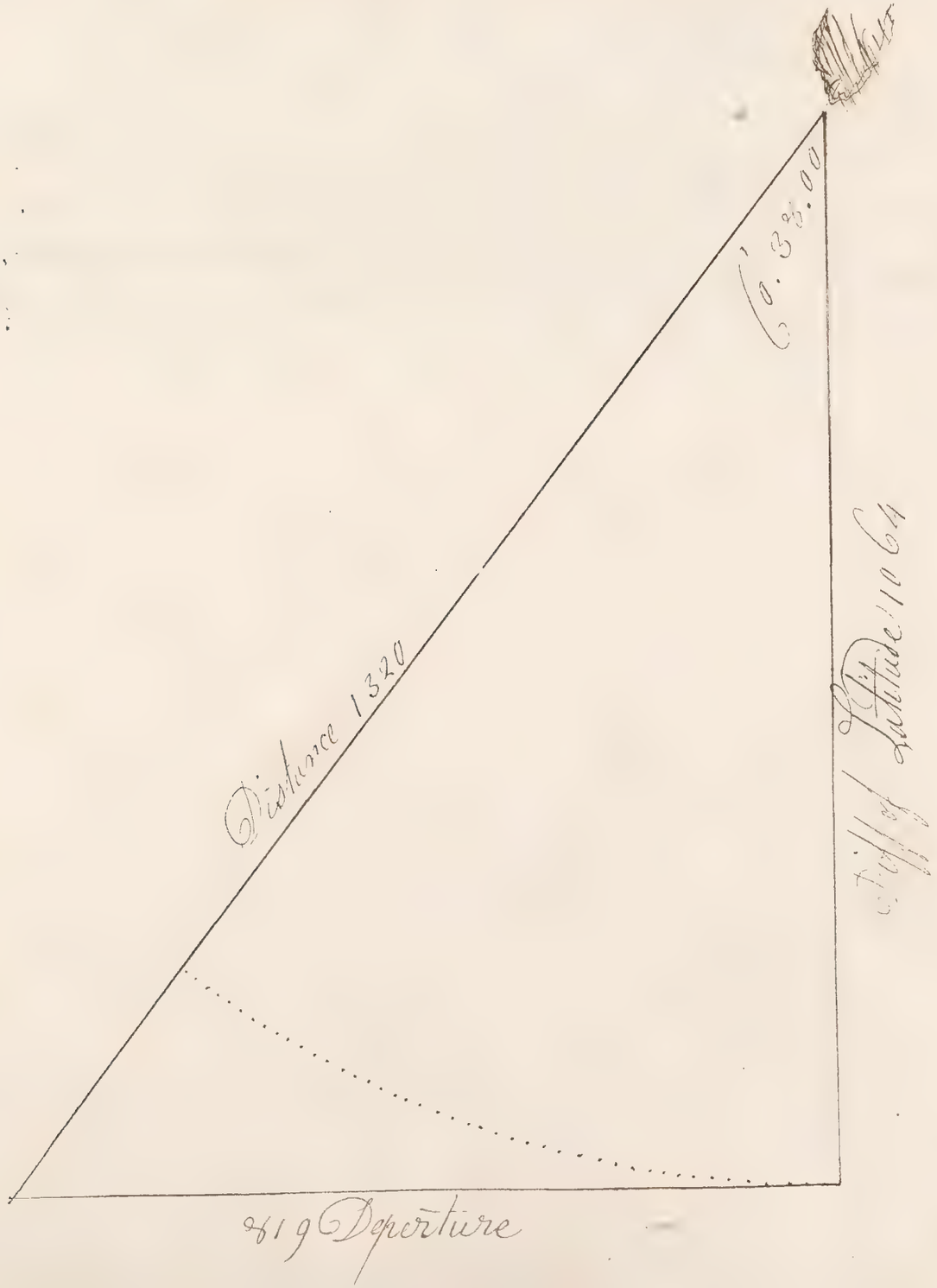
A. D. 1765

Instrumentally

	Lat.	Long
Start.	50.07 No.	03.47 W
Madeira	32.23 No.	17.26 W
	17.44	13.39
	60	60
	1064	819

as x of Latitude 1064 : Depart. : 819 : Radius 4500 : T. Co. 38.00 or SW½S.
as Radius 90.00 : T. Co. : 38.00 : Depart. 819 : Dist. 1320

A Calculation of the true Distance
from the Start Point on the East
of England, to the Island of Ma-
deira in the Canaries by the
Plain Chart



Preparation

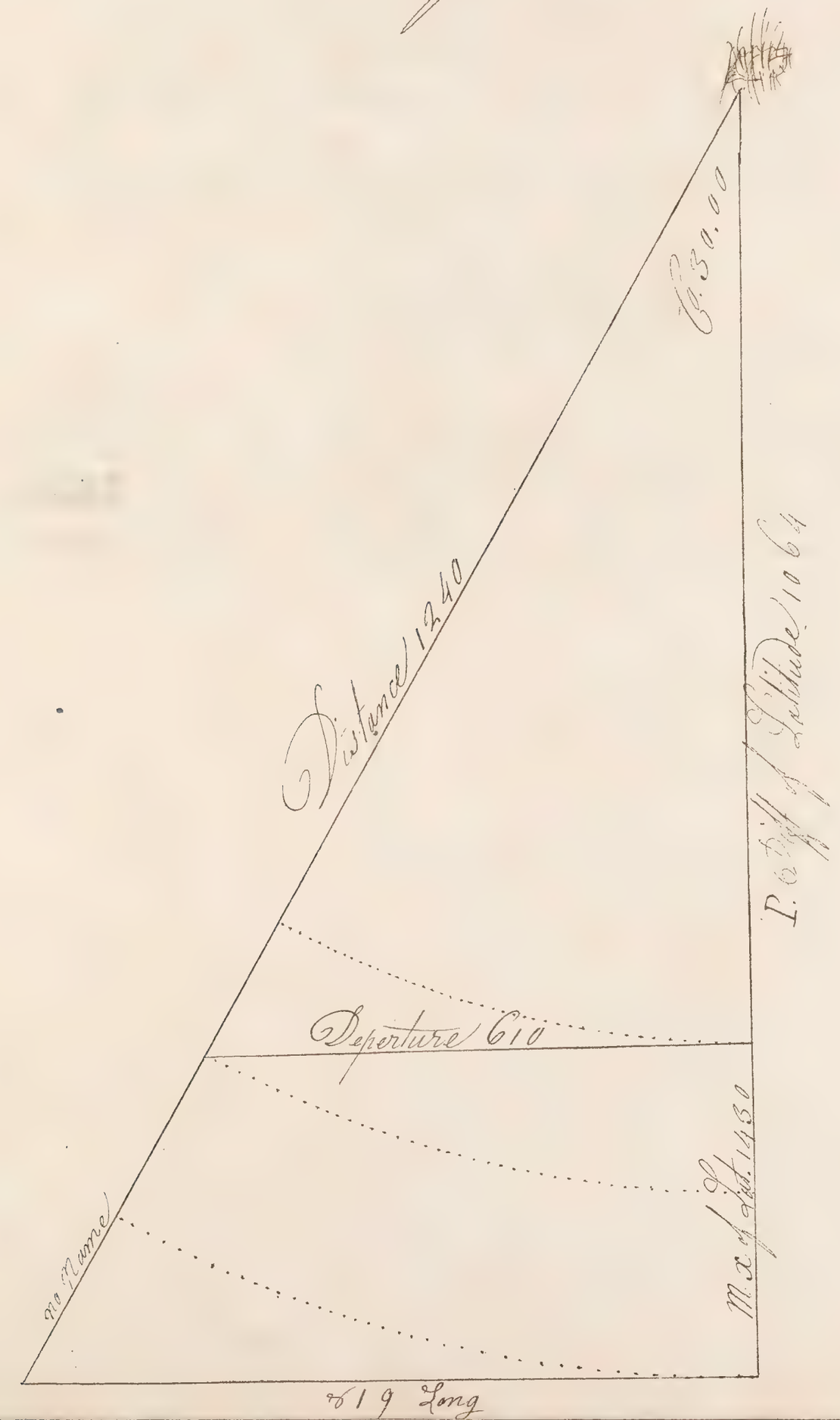
	Lat.	M. Lat.	Long	
Start. Point.	50.07 N.	34 55	9.47 W	
Madeira.	32.23 N.	20 55	17.26 W	
	17.44	1430	13.39	
	60		60	
	1064		819	

as M x Lat. 1430 : Long. 819 :: Rad. 45.00 : T. Co 30.00 S S W 3/4 W

as Radius 45.00 : T. Co. 30.00 :: x Lat. 1064 : Depart. 610

as Radius 90.00 : T. Co. 30.00 : Depart. 610 : Dist. 1240

Traverse by Meridian



Preparation

	Lat.	M Lat.	Long
Start.	50.07 No.	50.07 No.	03.47 W
Madeira	32.23 No.	32.23 No.	17.26 W
	17.44	Sum 82.30	13.39
	60	Mid. Lat. 41.15	60
	1064	Co. Mid Lat 48.45	819

as Radius 90.00 : Mid Lat. 48.15 :: Long. 819 : Depart. 600
is x Lat. 1064 : Departure 600 : Radius 45.00 : T. Co. 29.30
as Radius 90.00 : Sine Co 28.00 : Depart. 600 : Dist. 1220

Distance 12.20
Depart. 6.00
Mid Lat. 41.15
Departure 10.69

The Panther from England towards Madeira

H	M	Sk	Course	Winds	Wednesday Novem 11 1763
2	—	—			Light airs fresh Gales &
4	—	—	Wsw	SSE	Wind and fair weather, at
6	—	—	SW	SSE	2 P.M. hove to Sent and took
8	4	—	Sundry courses		on Top sails, at 5 brought to
10	7	1	WSW		Steer'd SSE from off the
12	7	2			South shore land, at 1 P.M.
2	7	2			got in the long Boat and
4	7	4	— —	SSE	Stow'd the Sent Anchor on
6	7	—	— —	SSE	Gunnel
8	6	4	WSW		
10	6	4	WSW	E	
12	7	—			

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34

Cape Ortegal

Cape Finisterre

Burlings

Lisbon

Portugal

Spain

Cape S.t Vincents

Cadiz

S.t reights Mouth

Bilbao

Medera

The Panther fr. England towards Madeira

Thursday Novem. y 15th 1753

H	H	x	Courses	Winds	
2	1	2	W.b.N.	E.b.S	This 24 hours for the Major part light winds and fair weather, at 8 A.M. Stood the Long Boat and unbent the Best and Small Bower Cables, at 10 the Start Point bore N.N.E Distance 6 Leagues from w. I take my Departure, in Company with the Neptune of London for Lisbon
4	1	2			
6	1	1			
8	1	—	W.b.N		
10	3	1	----	S.E	
12	3	2			
2	1	—			
4	1	1	S.W.b.S	E.S.E	
6	1	1			
8	1		W.S.W		
10	1	1	Start N.N.E 6 Leagues		
12	1	1			

	Bearings	Distance
Start	N.N.E.	26

Comes ..... S.S.W

Dist. 26

Diff. Lat ..... 24 S.

Departure ..... 10 W.

Latitude Acct ... 49.43 N.

Longitude in London 4.00 W.

Madrid Dist fr. y Start 10 W.

Variation allow'd 1½ W.

The Panther fr. England towards Madeira

Sunday Nov. 15th 1713

H	℔	L	Courses	Winds	
4	5	2	WSW	SW	Light Airs Moderate
1	5	1			Winds and fair Weather
6	1	1			the Peak Isle Bel ½ League
8	1	1			Course ..... S.W.
10	3	6	WNW	SW	Variation 9 8
12	3	3			Dist ..... 71 S
2	3	1	WSW	SW	Depart ..... 69 W.
4	1	—			Dist in Merc.ts .... 48.32 W
6	1	1	SWbW	SW	Long. in Prop. 5.46 W
8	1	—			Mid. Dist ..... 79 W.
10	3	5	WbW	SW	Variation Allow'd 1½ W
12	1	—			
Log	101				

	Bearings	Distance
Start Pt.	SW½S	120
Last Dimist.ce	SW½W	360

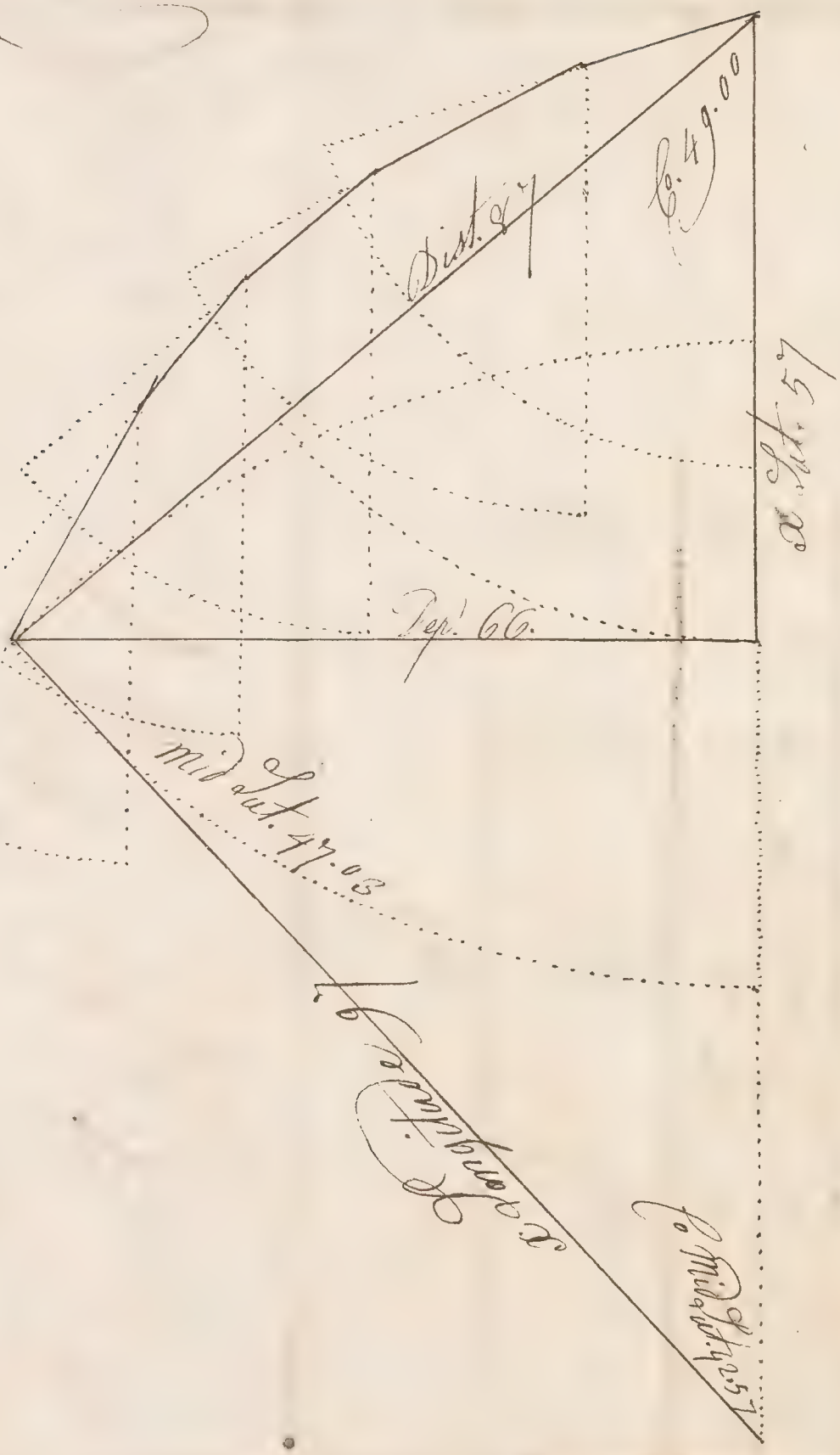
The Panther from England towards Madeira

H	M	Knots	Course	Wind	Remarks
2	5	1	WSW	SE	This 24 hours light Winds and hazy
4	4	1			Weather
6	4	1			Very little and Variable
8	4	2		East	Winds
10	3	6	WNW		Course ..... 154 M.ts
12	3	5	.....	ESE	Distance 104
2	3	3	WSW		Lat ..... 54 N.
4	4	—			Departure ..... 75 W
6	3	5	WbS	SE by E	Lat in ..... 47.32 N
8	3	2			Lat in by Obs. .....
10	3	4	W		Long. in ..... 7.39 W
12	1	1			Mid. Diff. 154
Log 96					Variation allowed 1½ W.

	Bearings	Dist.
Start Pt.	NE	225
Present Situation	SW½S	275

The Construction

Course	Dist.	Points	x Lat. N°	x Lat. S°	x Dep. E	x Dep. W
WSW½W	16	6½	—	4.6	—	15.3
WBS½W	21	5½	—	9.9	—	18.5
SW½W	15	4½	—	9.5	—	11.6
SW½S	15	3½	—	11.6	—	9.5
SSW½S	24	2½	—	21.2	—	11.3
				56.8		66.2
				57		66



x Lat. 57 : Rad 45.00 : Depart. 66 : T. C. 49.00.
Course 49.00 : Dep. 66 : Radius 90.00 : Dist. 97
Mid. Lat. 42.57 : Rad 90.00 : Depart. 66 : x Long. 97

H.C. Panther for England towards Madera

Sunday Nov. 18th 1753

H	Kts	Fr	Courses	Winds	
2	4	-	W	b W	Fair with hazy Weather
4	4	1			Thick hazy Weather
6	3	1	W½S	S b	
8	3	1			SW¼W
10	3	1	....	b W	
12	4	-	W b S		
2	3	6			
4	4	-	S W b S		
6	3	1	....	b	
8	4	1	S W		
10	4	-	....	S b W	
12	3	5			
Lo 8	90				

Course & Distance

Port Lo.	N E	310
Cape Finisterre	S B W½W	220

Distance 57

Dift Lat ..... 57 So.

Depart ..... 66 W

Lat in Acc ... 46.35 N.

Lat in Obs .... 46.43 N.

Eng. in Lat ... 9.16 W

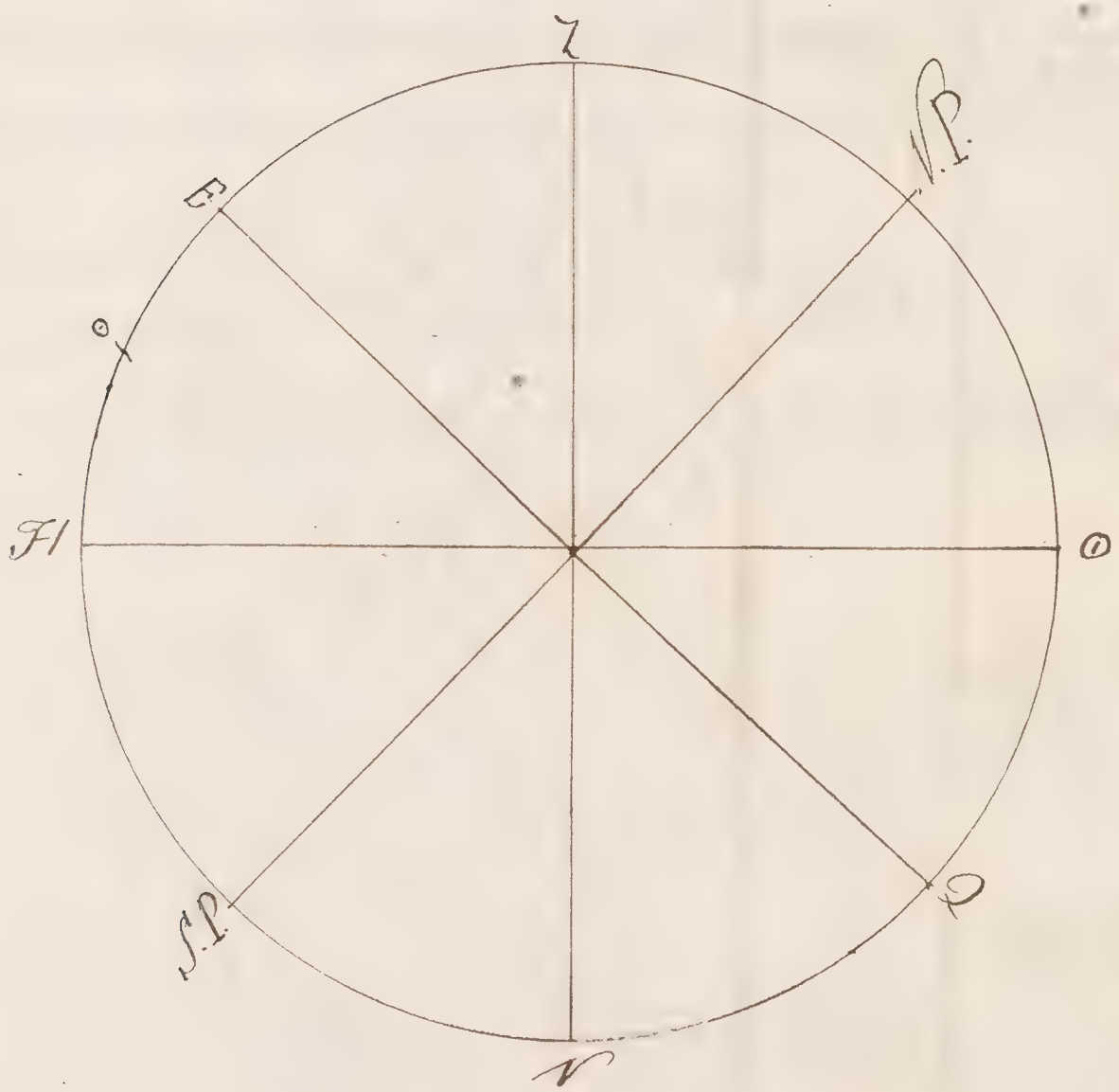
Mid Dep ..... 220 W.

Variation allowed 1½ W

Corrected Dist. 65.00 n.

Declin. 19.35 s.

Latitude by Obs. 45.25 n.



H. Panther fr. England towards Madeira

H	Ft	Kts	Course	Winds
2	3	1	WSW	BSW
4	4	1		
6	4	1	—	BW
8	4	—	WSW½W	
10	3½	1		
12	3	1	— —	W
2	4	1	SW½S	
4	4	2		
6	4	—	WSW	
8	3	2		
10	2½	—		
12	—	—		
	41			

Monday Noon 16th Jan 1815

This 24 hours light Airs and Calm. Employed as the 4th noon then, had a good Observation

Course ..... SWBS

Distance 60

Diff. Lat ..... 67 S.

Dept. ..... 43 W.

Lat in ..... 45.28 N.

Lat in Obs. ..... 43.43 N.

Diff. in Lat ..... 101 W.

Mean Dist. fr. last 2634 W.

Variation allowed 1½ W.

	Bearing	Distance
Start Point	ENE BN ¾ E	365
Cape Finisterre	NE ½ E	145

90.00 Latitude by Obs 45.25 N.

19.49 Nov 20: 1753 Suns Declin 19.49 S

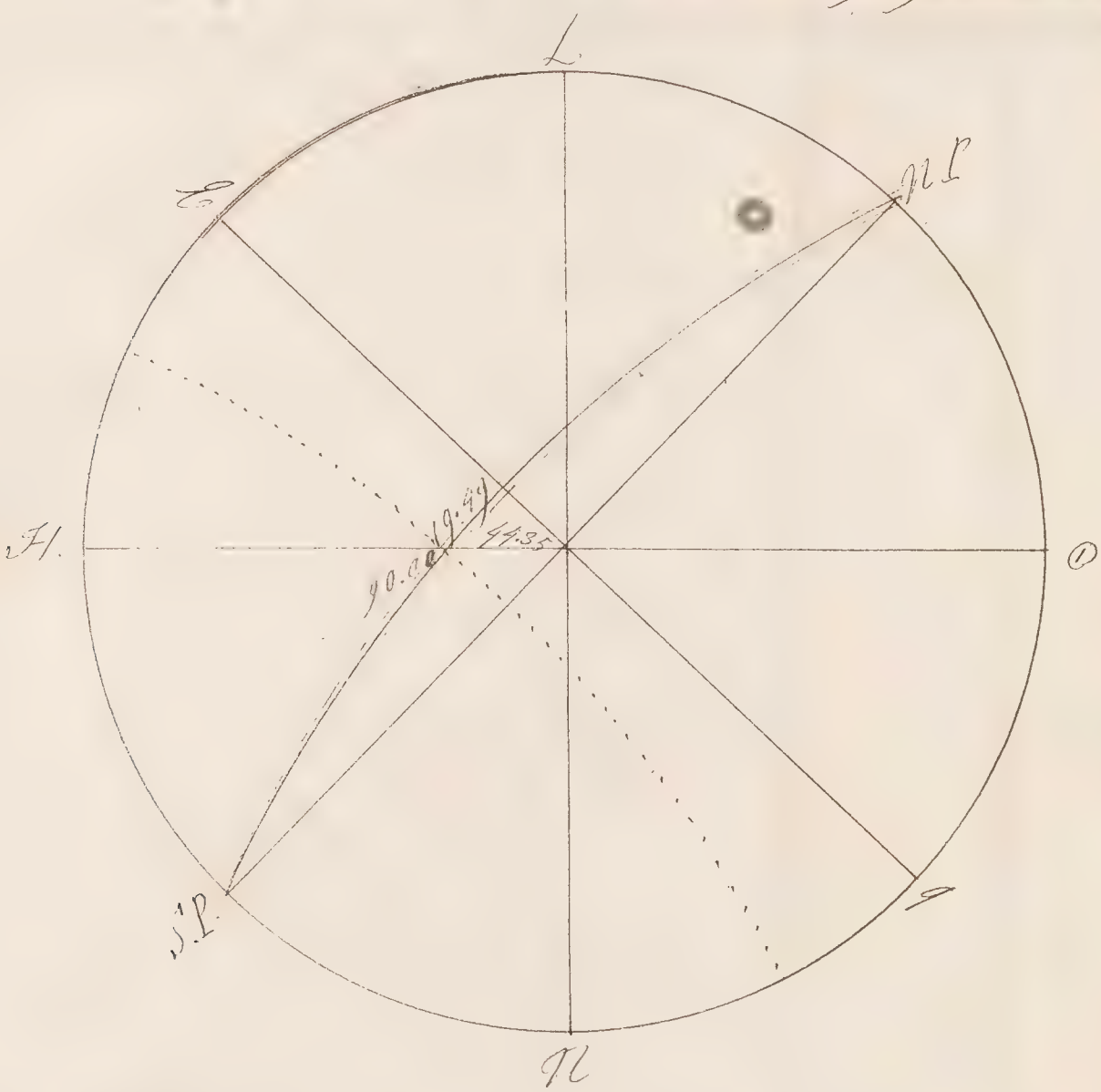
90.11

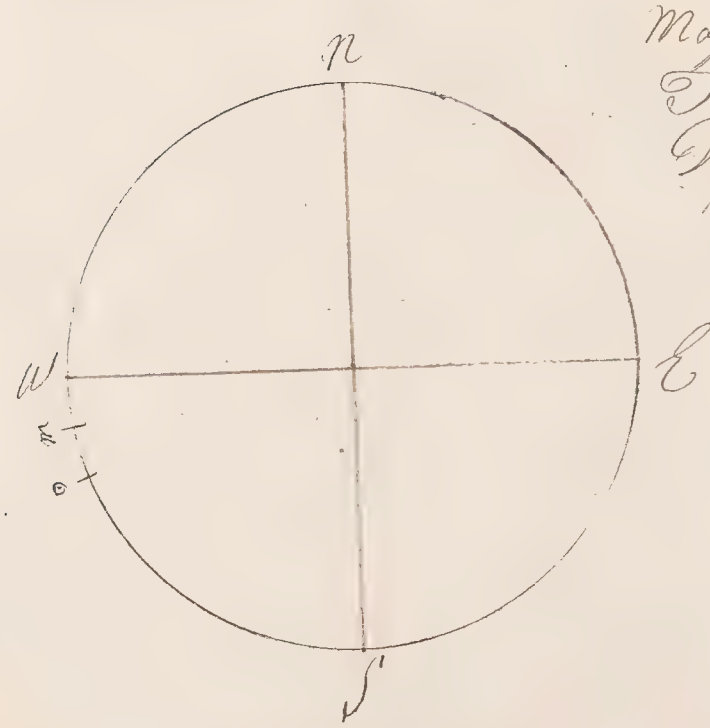
90.00

45.20

44.35

as 4th Sine Co. Lat. 44.35 : Sine Suns Declin 19.49 :: Rad 90.00 : Sine Suns Amp. 28





Magnuticak W. 14.02 S.

True W. 28.53 S.

Diff Variation 14.51 W

The Panther fr. England towards Madeira

H	℔	℔	Course	Wind	Remarks Noon to 1 P.M.
2	-	-			Light airs fresh
4	-	4	W		first part & hazy
6	2	-	Distance	Dist 28.53 M. Mag. Wh. 02 W.	and Calm the latter
8	3	1	Variation W. 14.51		increasing to a fresh Gale,
10	4	2	W.S.W.		Weather generally fair.
12	5	1	S.W.		
2	5	-	W.b.S.		
4	5	4			
6	5	5	—	S.W.	
8	6	-	W.S.W.	S.W.	
10	6	4	—	S.W.	
12	7	2	S.W.	S.	
Log 103					

	Bearing & Distance	
Cape Finisterre	S.E.b.E.	124
Start Pt.	N.E.	485

Light airs & Calm ... 4 1/4 M.
Calms ... 10 0
Light Airs ... 6 15
Fresh Gales ... 74 M.
Days Run Acc. 144.21 M.
Lat. in ... 12.04 M.
Mid. Dist. ... 337 M.
Remarks Continued
as Journ. 1 1/2 M.

The Nancy from England Onward. Madeira

H	h	℔	Courses	Wind	Remarks
7	1		SW	E	Light breezes & hazy
6	1		— — —	NE	Light airs & fair
6	1		— — —	N	Variable
5	2		— — —	NNE	Moderate ..... 8 3/4 Wt
10	2		— — —	NNW	Fresh 108
9	1		— — —		Light airs ..... 107 W
7	1		ESE	NE	Fresh ..... 14 Wt
1	1				Saw Sharks 42.340
6	1		—		
8	1	2	ESE	NNE	Light ..... 12.236 Wt
10	1				Moderate ..... 351 Wt
12	1		—		
					Variation allowed 1/2 W.
		116			

	Bearings	Dist
Ilha Graciosa	NEbN	611
Cape Finisterre	NE½E	126

The Manner fr. England towards Madeira

Thursday Aug. 22 1793

H.	F.	K.	Courses	Winds	
2	4	—	S°	W by W	Light breezes Pleasant
4	4	—			Weather & Wind ditto
6	4	2			Fair Weather ———
8	4	1	SSE & SW by S		ditto 58
10	4	1			ditto 1056
12	4	5'			ditto 745
2	4	5'			ditto 756
4	5	—	SE by S		Saw a Boat 41.20 N.
6	5'	1			ditto ..... 10.42 W.
8	5'	—			
10	5'	1	SE by S		Light Airs ..... 27 Mi.
12	4	1			variation Allowed 1 ½ W
Log	109				

Bearings Distance

Star Point NNE ½ E 610

Cape Finisterre NNE 122

The Panther for Englands towards Madeira

Friday Nov. 2 3d 1793

H	ℏ	d.	Courses	Winds
2	4		SW by W	
4	3	6		
6	3	6	SW by W	
8	3	6		
10	4	—	W by S	W by N
12	4	1		
2	3	2	SW by W	
4	3	4		
6	4	1	WSW	WSW
8	4	1		
10	4	—	W by S	W by N
12	4	2		
Log	94			

	Bearing	Distance
Cape St. Vincents	SBE	240
C. Finisterre	NBE¼E	150

First part Moderate Winds and Rainy weather then a large Swell from the Southward

Observ	38 1/4 8
Dist	4 62
Dist	365
Dist	2 8 E
Lat in by Obs	40.44 N
Lat in by Obs	40.48 N
Diff Lat	10.05 W
Mer. Dist	248 W

Variation allowed 1½ W

The Panther fr. England towards Madeira

Saturday Nov. y 24 - 1759

H	M	L	Courses	Winds
2	4	—	SbW	SE
4	3	6		
6	4	2	SWbS	SbE
8	4	1		
10	4	2	SbW	SbE
12	4	1		
2	3	6	SWbW	SbE
4	4	1		
6	3	5		
8	4	—	WbW	S
10	4	1		
12	4	—		
	96			

Fine 24 hours Moderate Winds and fair Weather. the Decks from the Ship Carpenter

Course ..... SW 1/4 S

Distance ..... 94 M.

Diff. Lat ..... 69 S.

Departure ..... 63 W

Lat in Noon ..... 39.19 N

Long in ..... 11.29 W

Mend Dist ..... 311 W

Variation allowed 1 1/2 W

	Bearings	Distance
Cape Finisterre	NE 3/4 S	190
Cape St. Vincents	NE 1/2 E	229

The Allowances for Steering in the Course of this Journal are as follows.

	Pts.
Fore hand and all Sails Set	1.
all Masts taken in ——	1½
a Top Sail Taken in ——	2
both Top Sails taken in ——	3

The Panther for England towards Madeira

H	F	S	Courses	Winds
2	1	—	WbN	
4	1	—		
6	3	1		in 1 H.B.T.S
8	3	2		
10	3	2		in 2 H.B.T.S
12	3	—		
2	3	—		in 3 H.B.T.S
4	3			
6	3	1	SbyW	SbE
8	3	2		
10	3	1	SW	SbE
12	3	1		
Log	80			

Sunday Nov. 25th 1753

This 24 hours fresh Gales
& Wind and fair Weather
In Day by a good Observation
I found my D.R. 10 Miles
to the Northward of my
Acct which Error I suppose
to the Sth Currents Northerd

	Bearings	Dist
Cape Finist.re	NNE 1/4 E	310
Cape St Vincent	SE by E 1/2 E	202

Yesterday

Lat ..... SW 1/4 S
Dep ..... 77 Wt
Diff Lat ..... 57 S
Lat in ..... 51 W
Lat in Acct ..... 33.21 N
Lat in Obs ..... 38.31 N
Long ..... 12.35 W
Mid. Lat ..... 36 W
Variation Allowed 1 1/2 W

The Panther fr. England towards Madeira

H	H.	D.	Courses	Winds
2	3	1	SW	SSE
4	3	—		
6	3	—	WSW	So
8	3	3		
10	3	2		
12	3	1	W	SSW
2	3	3		
4	3	1		
6	3	—	NE	
8	3	2		
10	3	1	ENE	So
12	3	—		
	76			

Monday November 26th 1753

This 24 hours hard Gales of Wind and Stormy Rain

Course ..... SW

Distance 27

Lat ..... 15 1°

Depart ..... 22 W

Lat in Pace ... 38.16 W

Long in ..... 13.02 W

Mid Dist ..... 30 4 W

Variation 8 Rumb 1 W

	Bearing	Distance
Cape d'Verd	ESE	216
Madeira	SSW 3/4 W	415

Derra

The Panther from England towards Ma-

Sunday Noon. 7th 1793

H	I	K	Courses	Winds	
2	3	1	E b S		This 24 hours fresh Gales
4	3	2			& Wind and fair weather
6	3	2	0 by 8	N. N. E.	a large Sea from the
8	3	1	E by N	S by E	Southward
10	3	3			
12	3	4	0h 2nd	N. N. E.	Course ..... EBN.
2	4	1			Distance 39
4	4	—	E.	S E	Diff. Lat ..... 19 N.
6	4	—	0h 1st	N. N. E.	Departure ..... 87 E.
8	4	1	E b S	S.	Lat in ..... 38.35 N.
10	4	3			Long in ..... 11.08 W.
12	4	2			
	90				Mend. Dist ..... 29 W.
					Variation allowed 1 1/2 W.

	Bearing	Distance
Cape Finisterre	S E	142
Madeira	S W b S 1/2 W	490

The Fanshawe of England bound to Madeira

H	K	F	Courses	Winds	Wednesday Noon of 25th 1753
2	1		ESE		Fair & clear Breeze & Gales
4	4	1	...		of Wind and pleasant Weather
6	3	2	WbS		at Noon by Observation I
8	3	5			find Ptt Ldg 10 Miles to the
10	4	1	SWbW		Northward of my Account
12	4	2			which Course I am glad to
2	4	2		SSW	find soon from the Coast
4	5	2			Madeira Yesterday
6	5	2	—	W	
8	6	4	W	—	Course SWbS
10	6	1	—	WbS	Distance 85
12	6				Lat. in 65 N.
	113				Lat. out 52 W.
					Lat. Diff. 37.30 N.
					Long. in 37.40 N.
					Long. out 12.11 W.
					Long. Diff. 349 W.
					Variation allowed 0 W.

	Bearings	Distance
Cape St. Vincent	ESE½E	156
Madeira	SWbS¾W	410

The Panther's Log. England towards Madeira

Thursday Nov. 29th 1753

H	R	L	Courses	Winds	
2	5	1	SW	SSW	This 24 hours Brisk Gales
4	5	1			of Wind and Cloudy ———
6	1	—		SW	Weather ———
8	5	1			Course ——— SWbS
10	5	1			Dist ——— 110 Mt
12	5	1			Dift ——— 91 Mo
2	4	2	—	SSW	Depart ——— 61 Mt
4	4	1			
6	4	1			Lat in Obs 36.09 N.
8	4	—		SW	
10	5	—	SSW	—	D. S ——— 13.32 Mt
12	4	1	—	SSW	Mid. Diu ——— 410 Mt
Log	111				Varia. Allowd 1/2 W

	Bearing	Distance
Cape St. Vincents	NbE	218
Madeira	SW½W	320

The Panther to England Coward of Madeira

H	M	L	Course	Winds	Remarks Begin 30. Dec 1794
9	4	—	SW	SW	Light breezes fresh
1	4	—			Gales of Wind and
9	4	—			Heavy Sea Shipped
8	4	2	—	SSE	
10	3	2			SSW 46 M
12	3	4			109 M
2	3	4	—	SSE	97 M
4	4	2			
1	4	2		SbE	Board 46 M
6	5	2			
8	5	4			Miles 34. 5 M
10	6	—			
12	6	6			Miles 14. 30 M
Log	109				

	Bearing	Distance
Cape St Vincents	SEBE 1/4 E	312
Madeira	SWBW	194

Miles 14 — 436 M

Am. Allow 109

The Panther in England towards Madeira

Sunday Decem. 2d 1753

The Panther fr. England towards Madeira

H	℔	℥	Course	Wind	Monday December 3d 1793
9	2	—	S W	N	Fair & hazy Weather
11	1	2			and Clear — by Log
6	2				& Soundings upon the Canaries
8	1	2	S W by W	N N W	and Observations agreeable
10	2				Observation, & Variation
12	1	—		N	Current Continues
2					
1					
6	1	2	S W	N W	
8	1	2			
10	—				
12	—	—			
	94				

Carried Over

Madeira W. 122

Observation at Land 1 Mile

S. 3/4 E.

35

37. 10

5 E.

52. W

32. W

15. 0 W

46 W

The Panther fr England towards Madeira

H.	M.	S.	Course	Winds	Wednesday December 7th 1753
2	2	—	W	W.S.W.	This 24 hours light Winds
4	2	1	Rain		and Weather as per Columns
6	2	1			the Current Conclude
8	3	2	—	E.N.E.	& entirely Lead
10	1	—	W.S.W.		Course — W.S.W. ½ W
12	1				Distance — 8 9
2	2	2	Fair		Lat. Sal. — 9 S
4	2	2			Depart — 8 9 W
6	2	—	—	E.N.E.	Lat in Hour — 32.20 N.
8	1	1	W.		Lat in Obs — 32.12 N.
10	2	2	hazey		Long in — 16.44 W.
12	—				Mid. Dist — 5 6 9 W.
					Variation allowed 1 W.

	Bearing	Dist
Madeira	W ½ S	37